SYMPOSIUM ON

ENVIRONMENTAL MITIGATION: SOLUTIONS TO PROBLEMS

Sponsored by

THE ALBERTA SOCIETY OF PROFESSIONAL BIOLOGISTS

THE ALBERTA ENERGY RESOURCES CONSERVATION BOARD

and

ALBERTA ENVIRONMENT

Westin Hotel
Edmonton, Alberta

April 24 and 25, 1984

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ALBERTA SOCIETY OF PROFESSIONAL BIOLOGISTS

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3. BIOLOGICAL ISSUES IN ENERGY DEVELOPMENT. 1979 Calgary Convention Centre, Calgary, Alberta. 89 pp.

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The printed proceedings were edited by Mrs. P. Thompson, Mr. D. Thompson and Mr. S. Stephansson.

Special thanks are extended to Mrs. Peggy Thompson for the tireless and extracordinary efforts in this and previous symposia in such a quite unassuming manner. Without Peggy's dedication and contribution the symposia would not be possible.

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The Alberta Society of Professional Biologists wishes to extend its thanks to Syncrude Canada, Ltd., who printed these proceedings.

PREFACE

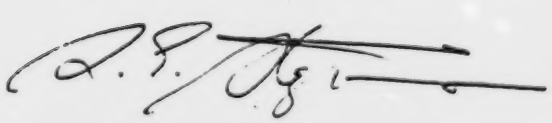
Message From The Symposium Chairman

This is the Seventh Annual Symposium sponsored by the Alberta Society of Professional Biologists. It is particularly appropriate that the symposium focused this year on the timely topic of environmental mitigation, an aspect of environmental management that affects all of us professionally and in our everyday lives.

In reading through the proceedings it is apparent that mitigation is indeed wide-ranging in scope and certainly broad in how it is perceived. The first step in mitigation involves determining values of living things and natural events, then convincing two often opposing parties that those values are realistic. Even if the parties agree on the values can they ever agree on the diverse means and measures available for mitigation? And most importantly what are the tradeoffs and who pays? As several of our speakers have noted social ramifications have added an entire new dimension to mitigation.

This symposium has explored many aspects of mitigation. We hope that all the participants found that the speakers shed some light on the theme and offered useful "tools" that will assist in resolving the complex nature of mitigation. The Proceedings should provide a useful reference.

The 1984 Symposium Committee of the Alberta Society of Professional Biologists wishes to express its sincere thanks to the speakers and participants. Special thanks to the financial donors who have made the symposium a reality and a worthwhile endeavour.



S.E. Stephansson, Chairman, 1984 Symposium
Alberta Society of Professional Biologists

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OPENING ADDRESS

HON. MILT PAHL

Minister Responsible For Native Affairs

Mr. Chairman, Fellow Speakers and Symposium Delegates. Firstly, let me express regrets on behalf of the Honourable Fred Bradley, Minister of Environment, for being unable to present the Opening Address to your Symposium this morning. Secondly, let me bring you greetings from the Alberta Government, and particularly Alberta Environment, which is co-sponsoring this symposium together with the Alberta Society of Professional Biologists and the Alberta Energy Resources Conservation Board.

When Fred Bradley became aware that he would be unable to attend, he suggested that I would be a suitable alternate speaker, considering my background in the oil industry, The Alberta Oil Sands Technology and Research Authority, and The Alberta Oil Sands Environmental Research Program. In fact, I am quite familiar with the various fields of study within biology. Mammalogy is the study of mammals, ichthyology is the study of ich (the gooey stuff on lake bottoms), ornithology is the study of orniths, and herpetology ..... well that must be the study of herpes.

As a speaker, I am not sure whether I am supposed to be in the "serious" category or in the "entertaining" category. I see that Dr. Lindsey is going to be discussing the topic of dragons at today's luncheon and David Broadfoot is going to be entertaining you at tonight's banquet, so for fear of trying to measure up to those two speakers, perhaps I will stay on the serious side this morning.

From the symposium brochure, I note that this is by no means the first symposium being sponsored by the Alberta Society of Professional Biologists. In fact, it is the eighth symposium in as many years. I think the list of symposium topics from 1977 to the present speaks well for the fact that the

ASPB is very much in the business of providing a public forum on issues of both concern and interest to industry, government, and the public at large. It is the organizing of such symposia that brings together groups of individuals such as I see here this morning who are experts and professional in a variety of fields, and most importantly, forums such as this permit the frank discussion and open airing of topics that are often considered sensitive. However, without open discussion, issues such as environmental impact assessment and environmental mitigation will not improve and evolve as they should. Based on the list of topics for this year's symposium, I note that not only biologists are present here, but engineers, land owners, native leaders, and even dragon experts are present as well. I think this cross-section of backgrounds indicates that environmental mitigation is a topic for discussion and consideration by all of us. The Alberta Society of Professional Biologists has played a key role since 1977 in bringing together similar cross-sections of individuals to discuss environmental impact assessment, energy development, environmental management, water management, economic development, and other topics.

The role of professional biologists in the areas of environmental impact assessment and environmental mitigation is indeed an important one and is changing rapidly. It is the biologist who very often provides the basic information upon which potential effects of development may be based and measured. In addition, the biologist provides, based on his understanding of the natural environment, a variety of development impact scenarios associated with given projects and programs. I see the job of today's biologist as being one that involves the speeding up of the evolution of biology as an art to biology as a science. The Alberta Society of Professional Biologists is to be commended for its very significant efforts in this area.

"Environmental Mitigation: Solution to Problems" ..... why is the topic of environmental mitigation so important in today's society? My personal perception of environmental mitigation is that it very much involves compromise, whereby on the one hand various sectors of society are demanding fuel for their vehicles, electricity for their homes, water to irrigate crops, lumber to build homes, coal products for production of steel, recreation areas

to enjoy, and jobs to bring in the groceries .....; and on the other hand, all of us - industry, government, the public at large - have an obligation to ensure that as we go about providing for these many demands, we respect the environment from which we obtain these various products and aspects of our lives. That is, the area of environmental mitigation has evolved relatively quickly into a science of its own which demands individuals to meet the challenge of providing recommendations that permit the orderly development and use of those natural resources that the public demands, and at the same time mitigate those aspects of such development and use that may be considered negative or perhaps taxing on the environment. The work "mitigate" is defined in the dictionary as "to make less severe". It therefore becomes the task of those within industry, government, and the general public to "make less severe" the impacts of the development of an oil sands plant, a hydroelectric project, a hiking trail, and so on. I come back to the word "compromise". Development of environmental mitigation programs becomes a task of compromising: that is, settling differences among views on land and water use through mutual concessions. Sound environmental mitigative programs can accommodate many demands and goals. But a very necessary prerequisite is that we all keep an open eye and an open ear to all of the issues surrounding the development, use, and management of our natural resources.

Who is involved with the development of environmental mitigation programs? There are many players. Governments develop and issue standards for the orderly development of natural resources with an emphasis on involving minimum impact on the environment during various stages of such development. Industry plays its role by developing and implementing actual environmental mitigation programs. In fact, here in Alberta we have numerous examples where industry has gone beyond the standards established by the government in addressing environmental issues within their developments. In a number of these cases, not only is mitigation addressed, but habitat enhancement over and above the original state of the habitat becomes a part of both the development and reclamation phases. Thirdly, the public plays a very significant role through participation in public hearings. It is important that, because the public expects solutions to environmental concerns, it has the opportunity to contribute in the process of identifying those areas of environmental

concern that should be addressed as part of specific natural resource development projects.

It is important to point out the value and indeed the necessity of industry, government, and the public at large sharing information on the various aspects of environmental mitigation in order that we all may benefit by avoiding repetition of what may be considered mistakes, and also profit from previous successful mitigation programs. I see the forum provided by this symposium as a very important step in the right direction in this regard.

In closing, I would like to take this opportunity, on behalf of the Alberta government, my colleague The Honourable Fred Bradley, and myself, in wishing you success for a very educational and productive symposium. I am glad to learn that the published proceedings from this symposium will be made available to those individuals and agencies interested in improving the whole area of environmental mitigation. The fact that the discussion papers to be presented over the next two days will be published, will ensure that you basically get a "maximum bang for your buck" in terms of disseminating what I am sure will be many good ideas.

Thank you.

KEYNOTE ADDRESS

A PERSONAL VIEW OF ENVIRONMENTAL IMPACTS AND THEIR MITIGATION

VERN MILLARD

Chairman, Energy Resources Conservation Board
Calgary, Alberta

INTRODUCTION

It is with some trepidation that I address the matter of environmental impacts and their mitigation before a Society of professional biologists. As you know, I have no expertise in this area. On the other hand I have over the last ten to fifteen years listened to a lot of experts, as well as lay people, address the subject. Perhaps some of the concerns and views that I have heard expressed at ERCB hearings might be of some interest to you and might possibly present a different perspective.

It seems to me that we too often forget that virtually any endeavour in our society results in some type of environmental impact. There is a tendency for us to assume that environmental impacts are caused by the activities of others but not by ourselves. The resource industries obviously are the cause of many environmental impacts but so are agriculture operations, transportation, etc. In other words, impacts are inevitable, and are a fact of life. The questions that need to be asked about them are:

(a) Are the benefits that are derived from the activity commensurate with the impacts?
In other words, when all of the costs have been allowed for (both private and social), are the benefits greater than the costs including the environmental impacts.

(b) Can the impacts be satisfactorily mitigated?

The basis for my views on these matters is the evidence that has been presented at ERCB hearings to consider specific proposals. The application/review process for energy developments provides a unique mechanism for identifying the concerns of the public, the scope of the impacts and mitigative possibilities. It should also be noted that the information made available at project hearings usually permits one to make at least a rough cost/benefit assessment of the proposed project.

Except for a few special cases, it is only proposed energy resource developments that are subject to this kind of public review of impacts and their mitigation. The information obtained by the process, however, has broader implications than the specific energy developments leading to it. Indeed, the bank of information developed is substantial but I question whether it is being fully utilized. I suggest, therefore, that it would be beneficial to members of your society to have knowledge of the application/review system and I am pleased that your program provides for a panel discussion of it by Hunt, Brushett and Smith.

OVERVIEW OF ENERGY PROJECTS IN ALBERTA

While the activity of the energy industry in Alberta has been in a downturn for the last couple of years, the province has, over the last five or ten years, been subject to an amazing rate of development. For example, during the last five years 23 thousand wells have been drilled, 95 thousand kilometres of pipelines licensed, 65 sour gas plants approved and 20 thousand kilometres of transmission lines installed. Each of these activities has had some degree of environmental impact, and, of course, a related mitigative program. I suggest that it is against this kind of backdrop that we should address impacts and their mitigation.

In considering the Alberta scene we should also recognize that the total level of energy development activity in this province far exceeds that experienced in other jurisdictions. That fact has many implications. It, of course, means that the number of environmental impacts is much greater. It suggests that there must have been greater strains on the system. It must

also mean that we have acquired or should have acquired more experience in mitigating environmental impacts.

TYPES OF ENVIRONMENTAL IMPACTS

I suspect that when the public, and probably ourselves, think about energy resource impacts we visualize the more dramatic cases such as a surface coal mine being developed on cultivated farm lands or a transmission line cutting a swath through a forested area. In reality, however, resource developments result in thousands of impacts in a year, most of them relatively limited in scope, but, of course, some of the major projects have much broader implications.

I suggest that environmental impacts fall into two broad categories.

(a) Direct

These are the on-site impacts due to the specific development, such as drilling a well, constructing a pipeline, installing a transmission line, etc. The impacts are generally related to surface disturbance and their consequences are limited - although that may not be the view of the landowner whose lands are affected.

(b) Indirect

These impacts are generally off-site and relate to possible effects on air, water and land from the specific project. An example would be the possible impacts of the emissions from a sour gas plant.

In late 1981 the ERCB held hearings to consider amendments to two sour gas plants west of Calgary (Jumping Pound and Quirk Creek). During those hearings interveners identified several concerns about the possible impacts from the general operation of sour gas plants. They referred to the possibility of SO_2 emissions acidifying the soil downwind from the plant as well as nearby streams and lakes. They also raised questions as to whether some livestock problems, such as White Muscle disease, might be aggravated or even caused by SO_2 emissions from sour gas plants. Possible health effects through the emission of heavy metals and toxic chemicals were raised.

At other ERCB hearings, concerns have been expressed by the public respecting the possible impact of major energy developments on ground water systems, competing land uses such as trapping and recreation. Transmission line hearings frequently result in local people being concerned about visual impact.

Not only is there the problem of dealing with the specific impacts that occur from a proposed project, whether direct or indirect, but there is also the question of how various segments of the public perceive those impacts. We may tend to view the future impact as being relatively well defined but that may not be the general public's perception. In fact, accounts in the media, as well as evidence presented at ERCB hearings, demonstrate that in many cases some segments of the public perceive the impacts quite differently than is described by the evidence. One illustration of this occurred at the hearing to consider a transmission line from the Calgary area to Phillips Pass on the British Columbia border. One of the possible routes for the proposed line would have been primarily across cultivated land. The farmers in the area potentially affected got together and made submissions to the Board with respect to the impact the line would have on their farming operations. They contended that some 32,000 acres of land would be sterilized if that routing were approved. To arrive at that conclusion they assumed that one-half mile on each side of the proposed line would be sterilized as far as agriculture was concerned. They were convinced that their assessment was realistic even though it obviously bore little relation to actual impacts from existing transmission lines in the area. This type of pre-conceived view arises from the converted talking to the converted, and unfortunately they are extremely difficult to deal with.

Consideration of the types of impacts should also recognize that virtually all of them occur in rural areas. It is we urban dwellers that require new sources of electric energy which in turn requires the development of surface coal mines, transmission lines, etc. but it is the farm family that may have to relocate in order to permit development of the coal mine or who may have to live with the transmission line crossing its land. Naturally, landowners have concerns about the impacts that affect them directly. I expect

that Mike Cooper and Chief Piche may have something to say about these kinds of impacts.

QUESTIONS THAT SHOULD BE CONSIDERED ABOUT THE IMPACTS OF ENERGY PROJECTS AND THEIR PROPOSED MITIGATION

Over the last several years individuals and groups have identified concerns and issues respecting proposed energy projects at ERCB hearings. It is not uncommon for the same questions to be raised at successive hearings. Indeed, each type of project frequently results in the standard set of questions and issues being considered. Why do the same kind of issues continue to be debated? Perhaps we should ask the following questions:

(a) Do we have a realistic assessment of the impacts that will result from specific energy resource developments and, if so, have we made that information available to persons who may be affected? For example:

  (i) How much cultivated land is <u>actually</u> taken out of production because of transmission lines?

  (ii) What is the <u>actual</u> impact on future productivity of soil disturbed by constructing a wellsite, building a pipeline, etc.?

  (iii) What is the <u>actual</u> success of reclaiming lands that are subject to the major disturbance of surface coal mines?

(b) What is the state of scientific knowledge about the extent of the more complex environmental impacts?
For example,

  (i) During the Lodgepole blowout probably some 500 tonnes per day of sulphur were emitted to the atmosphere for a period of 67 days. Estimates of the sulphur deposition in the nearby area

varied by a factor of twenty or more. Why is there such a difference about a matter that appears to be amenable to scientific evaluation?

(ii) The question of soil acidification due to SO_2 emissions is frequently raised at hearings held to consider sour gas plants but there appears to be a wide spectrum of scientific opinion as to whether or not the resultant deposition (which in itself is open to debate) will result in significant acidification.

(c) Do we have sufficiently accurate base line data to be able to make "before" and "after" comparisons?
For example,

(i) Do we have a reasonably accurate understanding of background sulphur deposition?

(ii) Do we understand the "natural" environmental regime in complex cases such as the Peace-Athabasca Delta? Possibly Gordon Pearce will be referring to this in his discussion of the Slave River project.

I am sure we would all agree that unless we have a reasonable assessment of the impacts from proposed projects, it is difficult, if not impossible, to adequately judge mitigative measures and evaluate the likelihood of their success.

On the basis of concerns expressed at ERCB hearings I submit that the following questions are pertinent in terms of mitigating certain environmental impacts.

(a) Should we have a prescribed way of safe guarding top soil disturbed by wells, pipelines, surface mines, etc. so as to preserve future productivity of the soil?

(b) Should there be standards as to the level of sulphur deposition that would be permitted? Should any such standard be regional in order to allow for the type of soil being impacted?

Assuming that we have a satisfactory understanding of the environmental impacts resulting from a specific project, as well as agreement as to how they might be mitigated, are we able to:

(a) address the local public's perceptions of the impacts and the mitigative measures for specific projects, and

(b) address the general public's perceptions about the impact of energy developments?

It seems to me that it would be unreasonable to expect complete agreement on the quantification of some of the impacts or the mitigative measures, particularly the indirect complex impacts. Consequently we need to question:

(a) how to identify and address the areas of uncertainty and dispute, and

(b) how to tie research activities into this whole process?

SOME THOUGHTS ON HOW SOME OF THESE QUESTIONS MIGHT BE ANSWERED

The ERCB application-review process provides a useful means of identifying impacts (whether real or perceived), weighing them in relation to the benefits that would be achieved from the project and considering how and to what extent the impacts might be mitigated. Unfortunately, however, the review process does not provide a means of answering many of the questions that arise during the hearing and which were referred to previously. Indeed, that is probably why the same questions recur time and time again. I suggest that action be taken to resolve this deficiency. Indeed, to some degree this process is already underway.

There are various means of addressing these unanswered questions. For example,

(a) In some instances, more information is required. Available information may not be sufficient to determine whether or not a possible or a perceived impact is a reality; however, that information might be obtained by investigation.

To illustrate this process, interveners at the Jumping Pound-Quirk Creek hearings contend that sour gas plants might be emitting toxic chemicals and/or heavy metals. Rather than leave that concern unanswered, with the possibility that it might become a general concern, the ERCB arranged for a research organization to make a series of tests on a group of existing plants. The testing program is not quite complete but results to date indicate the concerns are groundless. By having that information available the ERCB has been able to allay the concerns of many people and avoid a new perceived problem from developing.

(b) Many recurring concerns about impacts are not assessed, even though we could do so by drawing on the vast body of actual experience gained over the last 30 or more years.

For example, one of the issues that continues to arise is the question of future productivity from soil disturbed by wells or pipeline construction. Frequently there is conflicting evidence respecting this matter at ERCB hearings and yet the facts are that we have literally thousands of wells and thousands of kilometres of pipeline rights-of-way that have been reclaimed. What can we learn from that actual experience?

It was in recognition of that data base that led the ERCB to conduct a study on some 200 well sites during two summers which had been abandoned and returned to cultivation. As I understand it, the study was not a sophisticated assessment but was intended to provide

an overall view as to whether there was a relatively obvious difference in productivity or growth from the impacted area as compared to nearby unaffected areas. In a similar manner, Nova and Alberta Environment have reviewed the actual impacts of pipeline construction. I understand that in the latter case the study was undertaken to assess the relative effectiveness of different mitigative methods.

(c) Differences in the views of scientific experts are not resolved.

It is not uncommon at ERCB hearings to receive conflicting evidence from experts with respect to impacts and their possible mitigation. Where this occurs the panel evaluates the evidence as best it can and makes its decision. However, this does nothing to resolve the difference between the experts, and I suggest that in many instances those differences could be cleared up by a more complete review of the position of each of the parties and a more complete interchange of opinions than is possible in the formality of a public hearing. If that procedure were to be followed and if it were successful, it would lead to a better understanding of either the impacts or their mitigation.

For example, the wide discrepancy in the estimates of sulphur deposition from the Lodgepole blowout could be investigated by all parties in order to determine the most appropriate answer, as well as the best way of determining it. That informaion could assist materially in assessing the degree of sulphur deposition that is likely from sour gas plants, power plants and oil sands plants.

(d) Wide differences between public perception of impacts or their mitigative and scientific evidence is not resolved.

Where the public raises concerns and perceives impacts that are incompatible with scientific information at an ERCB hearing, the panel naturally gives much more weight to the scientific evidence in

reaching its decision. That process, however, does not address the perceived impact and the public probably continues to believe that its perception is correct and that the ERCB made a wrong decision or ignored their concerns. Many of these perceptions could be addressed by providing more information about actual operations to the public.

For example, the establishment of community committees for major resource projects such as power plants, oil sands plants or sour gas plants, provides a mechanism whereby the concerns of the local public can be addressed as well as providing a means of informing the public. I expect that Millard Wright will be commenting on that kind of process when he discusses public participation in the Hanlan Robb sour gas plant.

(e) Research activities frequently are carried out without public input or knowledge.

Where complex issues have been identified at ERCB hearings, but can only be addressed by sophisticated research projects, there is a tendency for either the government or the industry, or a combined government/industry group to undertake the research in private without public participation and without an information communication system of the results. That, of course, does nothing to assist the public who identified the concern in the first place.

For example, considerable research has and is being conducted in Alberta to answer questions about the impacts of SO_2 emissions on livestock. However, to the best of my knowledge there is little public involvement in those research programs and minimum dissemination of the results.

Well, so much for the possible alternatives to address the questions previously identified. Let me attempt to be more specific about what should be done in this area. I suggest that:

(a) a concerted effort should be made to either quantify or to agree on an approach to quantify the impacts of specific energy resource developments.

Examples would be well sites, pipelines, transmission lines and sour gas plants. Where opinion is divided, the issues should be resolved if possible. If resolution requires obtaining additional information, it should be secured.

(b) For complex major projects a special effort should be made to obtain valid base line data so that at some future date it would be possible to evaluate the "before" and "after" conditions.

(c) Steps should be taken to involve and inform the public about actual performance of energy projects in order to minimize the discrepancies between perceived and real impacts.

(d) The mitigative program should reflect and address the concerns of local residents and, wherever possible, should be a consensus of the various views.

(e) Research programs should be directed to find answers to the more serious and unanswered questions on either their impacts or their mitigation and the public must be involved and informed about such programs.

The Acid Deposition Research Program and the Medical Diagnostic Review for the general Twin Butte area are excellent examples of research programs being undertaken to answer questions. As I understand the process that will be followed in each of them, the public will be involved and will be kept informed. I expect that each of them will have a significant influence on how the public perceives sour gas operations in the province.

CONCLUSIONS

While substantial progress has been made over the last two or three decades in identifying impacts from energy resource developments and how they might be mitigated, much remains to be accomplished. Of particular importance today is the apparent gap between the public's perception and the scientific evidence and actual experience. It is vital that the gap be closed because in the final analysis it is the public that determines whether or not impacts are acceptable. In the case of energy developments, it is particularly important to resolve these issues because the impacts are virtually all rural oriented, whereas the benefits are primarily urban oriented. In view of this dichotomy we cannot afford to add the further complication of misunderstanding. The differences can be resolved and indeed efforts are being made to accomplish that objective. I suggest that further concerted action is required.

POLITICAL ASPECTS OF MITIGATION:
A LANDOWNER'S PERSPECTIVE

MIKE COOPER

Farmer, Cowley, Alberta

INTRODUCTION

When I was first approached to participate in this conference I was apprehensive about my lack of scientific background in the subject area under discussion. However, as I discussed the topic of mitigation with some of my neighbours and with members of your association it became clear that I have probably had as much practical experience with the topic as many of you have had, but from a different vantage point - that of a landowner.

In order to prepare for today I reviewed in detail the issues I have been involved with in recent years: the proposed Three Rivers dam; the 500 KV transmission line from Calgary to the B.C. border; proposals to clear-cut sensitive watershed areas; health problems associated with sour gas plant operations; and the reclamation of the first decommissioned sour gas plant in the province.

In each of these issues there were significant environmental impacts, and mitigation - as part of the environmental impact assessment process, has been mentioned. However, my experience with discussions of mitigation have not been terribly positive. Usually the subject is raised as a government official attemts to justify a decision that has gone against what the community has identified as the "right" approach. Mitigation is trotted out as something magical that will make up for the fact that a "bad" decision has been made.

In working on these issues I have become convinced that the basic problem we face is a lack of political will to protect our environment. Environmental

impact assessments are not taken seriously in this province and, as a result, discussions of mitigation out of context are both dangerous and misleading.

In focusing on the problems associated with environmental impact assessment and mitigation I'd like to briefly examine the following topics: the role of Alberta Environment; the environmental hearing process; the environmental impact assessment (EIA) process; the status of environmental information in this province; and what I call "ownership mania".

ALBERTA ENVIRONMENT

When the general public hears that Alberta Environment is involved in an issue it generally assumes that there is an independent agency involved whose main function is to protect the environment. However, if we can reasonably assume that a department's priorities are reflected in its operating budget and staff allocations it is clear that Alberta Environment is not in the business of protecting the environment.

According to the 1983 Estimates, Alberta Environment devotes 54% of its operating budget and 53% of its full-time positions to "water resources management", a euphemism for dam building. This contrasts with 20% of its operating budget and 20% of its staff positions for pollution prevention and control. Environmental impact assessment activities account for .006% of Alberta Environment's operating budget.

It is clear that the vast majority of Alberta Environment's resources are devoted to dam building (the figures would be even more dramatic if Heritage Trust Fund allocations were included), but I am not convinced that merely shifting the project promotion functions to another department would result in better environmental protection. The problems are philosophical as well as structural as we will see in the following sections.

ENVIRONMENTAL HEARING PROCESS

In Alberta, hearings at which the environmental effects of proposed developments are presented are conducted by agencies other than Alberta Environment: the Environment Council of Alberta; the Energy Resources Conservation Board; and the Alberta Water Commission.

The Environment Council is effectively Alberta's environmental watchdog. While the Council no longer posesses the power to call hearings on any subject (as the old ECA did), it still provides the public with excellent research, independent panels for public hearings and public involvement in its activities.

The ECA and Alberta Environment have had a curious relationship on water resources projects. Department of Environment engineers have proposed dam construction on the Paddle, Red Deer, and Oldman rivers. ECA panels have reviewed the department's position, consulted with the public and recommended that dams not be built. Typically, the Minister of Environment then adopts the minor recommendations of the ECA, pats himself on the back and ignores the message that dams are not the only way of managing our water resources.

Perhaps because of the ECA's independence and its failure to jump on the dam building bandwagon the ECA is in the forefront of the Minister of Environment's budget cuts (11% reduction for 1984) and future hearings on water resources projects will no longer be held by the ECA but by the Alberta Water Commission.

The Water Commission is a relatively new organization but its chairman has indicated on numerous occasions that he views the Commission's job as developing Alberta's water resources. In his view management means control and control means dams. Clearly, the decision to have this body conduct hearings on water development proposals means that environmental considerations will have even less prominence than in the past.

On energy related matters the ERCB is the forum for discussing environmental matters. For many this hearing process is attractive because it

provides for the cross examination of project proponents and intervenors, detailed review of environmental concerns and (perhaps most important), reimbursement of some intervenors' costs. While the Board does encourage detailed environmental discussions and has developed its own environmental expertise it is clear that the Board's function is not to act as an environmental advocate but rather to ensure the development of Alberta's energy resources.

Based on my experience, Alberta Environment's role in the hearing process should be of concern to the public. Before the ERCB its role can vary from having a staff member on the hearing panel to total non-involvement. Alberta Environment has also used inexperienced legal counsel from the Solicitor General's department at Board hearings with devastating results. Given the Attorney General's recent statements concerning environmental law it is not surprising we have a lack of environmental legal expertise in government. In the absence of a consistent presence at these hearings by Alberta Environment public interest groups such as Alberta Fish and Game and the Alberta Wilderness Association have been forced to fill the role as our environmental advocates before the Board. Given their role before the Board it is hard to understand why the Board and the Government refuses to reimburse them as they do other legitimate intervenors.

ENVIRONMENTAL IMPACT ASSESSMENT (E.I.A.) PROCESS

In 1979, Alberta Environment initiated a detailed review of its EIA guidelines. Industry, public interest groups and government officials participated in a process that led to a proposed new set of guidelines. This proposal went to the Minister of Environment in 1980 and four years later we are still awaiting a response.

The system under which we are operating is very arbitrary both in terms of whether or not an EIA is required, but also in terms of when one is required. For example when Trans Alta proposed several routes for the 500 KV transmission line through our part of the country, Alberta Environment required them to file an EIA. They even went so far as to review it, file a deficiency statement and required the utility to do further work.

A year earlier Alberta Environment proposed the construction of a dam on the Oldman River. The department was not required to submit an EIA even after the Minister had narrowed the potential dam sites down to two: Brocket; and Three Rivers (coincidentally the two sites of all those studied with the worst projected environmental impact). According to the Minister of Environment it is not necessary to do an EIA until a site is chosen. In the Dickson Dam case an EIA was not commissioned until two years after the decision was made to build a dam. Detailed environmental information is evidently not considered important enough to be included in the decision making process. By delaying an EIA we could be losing valuable environmental information that could form the basis for mitigation efforts.

There is also a lack of follow-up on EIA's when they are conducted. Without this follow-up our ability to predict environmental impacts in the future is severely impaired. For example during the Trans Alta 500 KV line hearings a critical elk wintering range was identified in the Whaleback Ridge south of Chain Lakes. Despite local intervenor arguments that the line should be re-routed the Board approved construction through the wintering range. To the best of my knowledge there has been no monitoring of the effects of this decision and as a result the next time the same argument is made before the Board we will have no better knowledge on which to base a decision.

ENVIRONMENTAL INFORMATION

We have already seen that environmental information is not considered terribly important in the decision making process. However, there are recent developments concerning access to information that should concern all of us.

The Federal Ministry of Environment has as one of its goals the dissemination of environmental information. The intent is clear: only an informed public can give the Minister of Environment the active support necessary to help in the protection of the environment.

In Alberta, Environment officials have taken a different view of the public's role and that of environmental information. In the past year we have

seen the following: the Minister of Environment inexplicably delay publication of an issue of Environment Views; the Minister of Environment refuse to release air monitoring information to the Lodgepole enquiry, despite legal opinions that the information was in fact "public"; the Minister of Environment introducing legislation that requires Ministerial approval prior to the release of any pollution monitoring information; and the Minister of Environment suggesting that the public should pay $30.00 per hour for the preparation of environmental information.

Clearly, the Minister of Environment views his role much differently than I do. His job should be the protection of the environment from the adverse effects of development, rather than protecting developers from environmental groups or interested individuals.

OWNERSHIP MANIA

Through the years governments, developers and landowners in this province have developed an almost maniacal view of ownership rights. The owner of a resource (whether it's soil, water or sour gas) is entitled to develop it regardless of the impacts on others. This view seems only to be moderated by the potential for civil litigation. Our ethnocentric view of our resources means that trees are valuable only when they become piles of lumber, water running in a wild river is "wasted" and that it is sufficient to preserve wilderness areas on tape in a video library.

Because we fail to recognize the importance of natural phenomena in their own right, mitigation becomes a difficult concept to deal with. If environmental concerns are largely irrelevant to the decision making process, how can anyone argue that special measures should be taken to minimize environmental damage?

In addition it is usually easier to deal with compensation than mitigation and in many instances the two have become synonymous. This creates special problems because we usually impose an urban biased market oriented approach to valuation in rural areas where no effective market exists. For

example, in our part of the country the river bottoms provide an oasis. Most of the top land is cultivated or treeless grassland and the river bottoms provide the only source of water and year round shelter. Yet when Alberta Environment examined the area all the engineers saw was uncultivated hillsides, bush and rocky shoreline that ARDA classes as "non-productive". As a result it was easy, (if incorrect) for them to insist that the overall environment would be improved by flooding 8,000 acres of our riverbottom to irrigate another 40,000 acres downstream.

In contrast to this extreme view of ownership of resources is the notion of stewardship. It is not a new concept. Indeed it is an integral part of most religious belief systems. Basically, it calls for us to develop and manage our resources so that we leave the world a better place for future generations. While the concept is simple its implications are profound especially in the areas of impact assessment and mitigation.

Since this topic is deserving of a conference of its own I obviously cannot develop it fully. I would encourage everyone to examine the work of the Christian Farmers Federation here in Alberta and try to apply the work they have done on stewardship to environmental matters.

CONCLUSIONS

The solutions to many of the problems I have identified are obvious. The removal of the development function from Alberta Environment would allow that agency to function more independently to protect the environment. Restructuring the hearing process to allow for a more formal intervention on behalf of the environment would ensure that environmental concerns could be publicly raised. Having trained environmental legal expertise would help protect the public interest. Adopting the "new" EIA guidelines would result in a fairer and more credible EIA process. Opening up access to environmental information would encourage more people to actively participate in protecting their environment. Finally, by encouraging people to think about the implications of the stewardship approach to our resources environmental concerns would be given more legitimacy.

These proposals are not costly, do not require extensive legislative changes and would not require more "regulation" of industry. However, it is unlikely that we will see any changes made until politicians in all parties are convinced that there is a constituency out there that will respond to and support the type of changes I have mentioned.

The challenge is twofold. For our part we must create and enlarge the environmental constituency so that governments will respond. For its part the government must take the job seriously and appoint a Minister of Environment who is prepared to stand up and fight for environmental concerns.

I look forward to finding out more about the intricacies of mitigation over the next two days and I would welcome the opportunity to discuss with any of you the details of our dam proposal or any of the ideas I have raised this morning.

Thank you.

NATIVE PERSPECTIVES RELATED TO MITIGATION IN RESOURCE DEVELOPMENT[a]

MARCEL PICHE

Chief, Cold Lake Band
Grand Centre, Alberta

Morning ladies and gentlemen. Usually when I open any kind of a talk it's (inaudible) my people. Although you are all my brothers and sisters I usually start off by paying respect to my elders as I am sure that you do yours. So for all of you that are the elders of your society, I'd like to say that without you, we the younger people, although I am approaching middle age, I still consider myself young, respect you because without you we would know nothing. It's a tradition amongst my people that we learn everything from the elders.

I realize that I have never spoken in front of a forum where I was probably the only Indian but having been chosen as Chief of my reserve, my responsibilities vary and I've learned to take on just about any challenge and so it gives me great honor to speak to you. You are all professional biologists and environmentalists and I see others who are lawyers and other professional people and I don't have the academics that all of you have the opportunity to take. However, I think that through my hard knocks in life I've learned a thing or two and I hope that I will continue to use those learnings as the struggle for my people continues.

I guess I've always been somewhat of a rebel and when Steff mentioned that I served three years in the Royal Canadian Air Force it wasn't a very easy thing for me to do. Even standing in line out here for coffee didn't sit too well with me. I had been through three years of that. But talking a little bit about being a rebel ... A number of years ago some Fish and Wildlife people (but I'm sure that there were some biologists involved, maybe

[a]Transcribed from taped proceedings.

some of you, I'm not sure) did a study of bears in Cold Lake. My people found that totally, really silly, actually stupid, because all that they had to do was to ask some of my elders and they would have learned all they had to learn about bears and about various other animals. But I was driving down the road north of my reserve (this road happens to go towards the air weapons range) and I noticed alongside the road a bear was rooting in some garbage that someone had thrown beside the road. At first I wasn't sure that it was a bear because it was a different color; it had a yellow thing sticking out of its ear here and a red one on this side and something around its neck. Then I just remembered that I had heard some characters were disrupting some of our wildlife in the area. So I felt sorry for that bear and I shot it, mainly because some of my elders still eat bear meat when it is treated right.

However, that particular bear they wouldn't touch. See, I found that the thing that this bear was wearing around its neck was a radio transmitter, and having looked at it, I thought, "This must be a radio transmitter". So what I did was, that day, the wind was blowing to the north-north-west. You know, Cold Lake is a fair sized lake, it's about 20 miles across. I had seen this truck that I though must be monitoring these radios, on these bears. So I took the radio off the bear and I had two bottles in my truck that were empty. So what I did was, I tied the two bottles to this radio and I threw it in the lake 'cause the wind was blowing out across. Anyway, a couple of days later a Fish and Wildlife Officer came to me, and he asked me various questions concerning the thing that was going on up there, and asked me kind of casually if I happened to be out hunting in that area in the last few days. Yeah, I told him I was, not really hunting, but I was up there. He asked me if I shot this bear, and I told him yes. Well, he asked me what I did with the radio, because apparently some of the people that were studying this bear were very confused as to why this radio, or this bear happened to swim across that lake. They couldn't figure it out. But anyway, I told him what I did and why. He was very concerned and I'm sure that we've created some hardships for some of the probably, biologists that were doing this study. I don't really apologize for that, because, like I said previously, if they had wanted to know anything about bears, they could have come to my people and we would have told them.

Anyway, to continue, I noticed that, I was speaking to a person this morning that seemed to be from Australia or at least he had that accent. Anyway, he said that in his country, cattle had no diseases that we have over here. It reminded me that Indian people had been here for thousands of years and we did not have the diseases that we are ravaged with now, cancer, and a few years ago, smallpox, that decimated my people. And he said that if some of the cattle diseases were transmitted to Australia, that it would wipe out their cattle industry. But, it almost did that to us, with the diseases that were brought to us. But we survived, and we will continue to survive. Hopefully, we will continue to hang on to what little land we have left.

I'd like to commend Mike, because he spoke briefly on, or just made mention of the fact that the society today wants to own everything. It's hard for me to think in those terms because I believe strongly, because my elders have told me, that we cannot own this land. I know the dream of just about everyone is to own a piece of land, a house, and the comforts of life. But, to us, we really can't see that because we still maintain that Mother Earth put us here, the Great Spirit put us here, to share with our brothers and sisters, who are the animals, and the grasses, and the trees, and the rocks of this land. We were put here to share and to use and to put back the way that we found it, this land. And that's the only legacy that we can leave for our people, because (inaudible) also mentioned briefly a legacy, to put back, the way we found the land, because we cannot control nature. I strongly believe that. I may get a lot of dissenting argument on that, but I'll argue that with anyone. Now, I'm sorry that Mr. Pahl, the Honourable Milt Pahl left, because today the government of the province does not recognize Indians. The Premier, supposedly, one-one hundredth of an Indian, or whatever, forgets that he is part Indian, will not recognize Indians. And in a lot of small ways what I'm saying is borne out, because in the Travel Alberta maps that are given out to us freely, you won't see one Indian Reserve on those maps. And also, on those brochures that were given out in your kits, there, it's called "Discovery Guide", and it lists ethnic backgrounds, English so many, Italian so many, French so many, and others, 18%. I guess that's where I fit in, or not at all. I'm not sure. So, I say this because, of all the frustrating battles that we've had to face with the provincial government, the federal

government, and big business -- but I won't harp on that because it's useless to be crying in the wilderness, so to speak, about the Indian cause and our concerns, which are many, and the injustices, which we feel are many. That's another time, another place.

I'd like to thank Mr. Millard. In some of the hearings that were held in Cold Lake for the proposed Esso projects, we intervened, my Band intervened, and we were listened to and we believe that we had a lot to do with, in the first place, when the mega-project was first approved, one of the stipulations was that no water be taken from Cold Lake, and I think we had a hand in that. And I thank the ERCB Board for listening to us about that and various other matters and concerns, environment matters that we are concerned with. But, it was mentioned this morning also that there are no real mitigative measures legislated for environmental concerns. I know this to be true because we've been hollering loud and clear in Cold Lake, our band has, and the government, except for the ERCB Board and the water management people, no one seemed to listen. Anyway, the water management people had agreed to put a, or one of the stipulations for putting the go-ahead to withdraw water from Cold Lake for Esso, was that they put a water monitoring station on our reserve, that we could control. And hopefully with that, it will appease, and also appease some of the older people. And also that we're able to say, when we feel that too much water has been taken out, because they said that, I think something like 22 million cubic feet of water, I'm not sure of the amounts, that could be taken out of the Cold Lake area, and 20 of that could be taken from Cold Lake. And already, with the towns of Cold Lake, Grand Centre, and the Medley Air Base, they take out a lot of water and with the application of Esso, it amounts to almost the capacity that should be taken out of that lake. However, another oil company now, Bow Valley, proposes to take more water out of that lake. Now, we argued last year that, in a very short while, that limit is going to be reached and then what we see down the road is that the government is going to change that limit to suit the multi-nationals, the big oil companies, and not the people in the area. Not only my people, Indian people on the Cold Lake Indian Reserves, but the local people in the area. Our fear is that those rules will be changed, so that oil companies will be able to take more water out of the lake. And, it's been proven to me beyond a doubt

that allowing the oil companies and other people to take out so much water from the lake, it will almost dry up, Cold Lake, which maybe sounds kind of far-fetched because it is a big lake. But since Esso began, they've been taking water from one of the smaller lakes just north of my reserve, called Ethel Lake, that's, I suppose, the government name for that lake. We call it Bear Lake. And we had been promised at that time that, from Bear Lake, there's a creek that, ever since I can remember, never dried up, never. It was clear, fresh water that we used to use for drinking purposes, for our livestock, we lived beside that creek, why, I guess it was almost a river because it was fairly deep and wide. But now, since Esso started taking water from Ethel Lake, and built a weir to control the flow of that creek, we don't have a creek anymore - little puddles here and there. So, if they can do that to Ethel Lake, and 20 oil companies withdraw water from Cold Lake, I'm afraid to see what will happen.

I'd like to go back just a little and say that my band - it's not a musical band, by the way, but that was a term given to us, I suppose by the government, and so we use it today - is made up of Chipewyan people, not Chippewa, but Chipewyan and Cree that we took in as the years went by. We are located on three reserves, one that is our larger reserve is directly south of the Beaver River, on Highway 28. Our small reserve is right adjacent to the Town of Cold Lake, which everyone is hungering after; it has the best beach and the best location for so-called development and it's only 177 acres, but it's home to my people and to myself. The other reserve is a little northwest of the Town of Cold Lake and that is, as the crow flies, about 3 miles from the Esso project, which still is the Lemming Project, the Ethel Lake Project, and now the Esso Resources Cold Lake Project, which the first and second phases are going ahead. They have recently applied to go ahead with the third and fourth phases. We have roughly a thousand people on my reserve and you hear all across the country about the unemployment situation on Indian Reserves. Well, the statistics show that 80 - 85% unemployment on a reserve is not rare. But we have on our reserve fully between 10 and 15% employed on the reserve.

Environmental concerns of ours date back quite a time to the fifties, because we were able to manage in the areas where we trapped, where we fished,

where we hunted, we managed our own conservation and I think we managed well. But since the Canadian Forces Base in 1950, or in the early fifties, other concerns came into being and those were social concerns. I know that whenever a major project is announced and ERCB hearings are held, that environmental concerns are heard and listened to, but ERCB says that there is nothing they can do about social concerns, that it's the government's responsibility and the provincial government says, "You are a federal responsibility, I can't help you". And the federal government told me just in the last few days, because Esso is going ahead on a phased project, that it won't affect you that much, so you don't need that much help, anymore help than you're getting now. But, with Esso going ahead with their phases 3 and 4, that means about, bringing in by this fall, about a thousand workers in the area. And, there are about eight or nine other oil companies in the area that have pilot plants and are expanding and they also have 50 to a hundred workers. And, you know, some of you may have been involved in other areas where large developments took place. A construction worker works hard, but in the evening, he likes to play. And I've gone through that, too. I grew up listening to people coming out of a bar on a Friday, Saturday night, a case of beer, a couple of guys, "Let's go pick up some squaws". That, today, is prevalent among construction people. Granted, they're hard working people, basically honest, maybe basically want to advance themselves, but they're away from home, they want to play, the playground always ends up being an Indian Reserve, where our youth, young girls, young boys, are influenced with alcohol and now, today, drugs, and our young girls are taken advantage of. It creates a lot of hardship for us, a lot of family breakups, a lot of drinking, and general, our reserves get messed up and this is borne out by what happened in Fort MacKay. I've been crying long and hard to the government to see what has happened to those people 'cause I don't want that to happen to mine, or the Cold Lake reserve. And I have more luck talking to a stone wall. And I hope that those of you who may work for the government, and those of you who may be concerned, will pass this on to your colleagues, or whatever.

I've said that my band, and we personally, are concerned with the environment, and we've tried through the ERCB and the water resources management people to have some mitigative measures put in. We've been successful to

a point where we will have the water monitoring station on the reserve and also, from the ERCB's suggestion to the government, that air and environment monitoring stations, portable stations, come to our reserve from time to time. Although, I know in the long haul that they won't be enough, because since 1978, I tried to ask for something that Mr. Cooper mentioned this morning, baseline data, so that we could have something to compare in case, 10 - 15 years down the road, something happens, both environmentally and to the health of my people. If something happens, what do we have to compare it to? We have nothing. So, we've yet to be able to convince various people that we need those kinds of studies so that when adverse effects, when we perceive adverse effects, that we'll have something to compare it to. We need that.

I spoke briefly on the impacts at Fort MacKay, both environmentally and socially. Environmentally, they've lost all their traplines, and the animals in the area have gone elsewhere, or have been hunted out and I, along with the rest of my people, still depend a lot on game for our food much like (inaudible) flocks to McDonald's. We really depend a lot on game. You know, I lived many years in your society, but today, when I go out to conferences, to meetings, after a couple of days I can't eat any more, because I have to get home to get some fish, moose meat. The majority of my people are like that and because of the oil development so close to our reserve, like I said, three miles, all of that, those hunting areas have been taken away from us. And with the Air Weapons Range, which traditionally we held and we trapped, hunted, fished in that area for I don't know how long, and that was taken away from us. And today, my reserve is largely a welfare state. We have a generation and a half of people that know nothing but welfare. It's sad, but we are trying to change that, and hopefully that proud Indians that you learn about, or hear about in grade school in that one day a term.

I tried to put across to you that I have (when I say I, I mean my people), have strong ties to the land, to the environment, to the animals, the trees, grasses, and all that. The government only seems to want to listen to the multi-nationals, Exxon, Chevron, and their subsidiaries, Esso, BP, you name them. So, what kind of mitigative measures can we look for to help us in our concerns with the environment and also socially? What is there? Really, nothing is in place as mitigative measures for those concerns. You know, when

my elders tell me that Cold Lake, in the last few years, has gone down, it does not have the quality of water that it did 40 - 50 years ago, I believe them. But it seems that scientists and other people that are involved don't believe that. They have to measure things, they have to test things, much the same as they did with the bears. The Indian still knows the land today, and they should be listened to. But government in its wisdom still wants to measure things and monitor things with no end results, really, and we're told that, in order for us to advance economically, we have to give up certain things, meaning, we have to give up some environmental concerns and Milt Pahl spoke this morning about concessions. I really don't believe that that should have to take place in this so-called energy development. Is it really development? Do we have to give up the environment? Do we have to try to control the environment? As I said before, we cannot control the environment and I strongly believe that. For a time, we may be able to control the environment, we may be able to build a dam and a large hydro project and take all the minerals out of the ground and people will benefit economically from that. But it can't go on forever. And it's up to me, up to you to tell the government, not only tell them, but to convince them, that we can't go on, that the people have to be listened to, and not the multi-nationals, because, to my way of thinking, they're the ones that run government, where you should be, where we should be running government.

I've said quite a few things about the concerns of the Cold Lake Indian Band, but really, those concerns are not unique. I'm sure a lot of your people have those same concerns. A lot of my neighbouring Indian communities have those same concerns. I'm very interested to listen for the next couple of days as to what your answers are to mitigate some of the environmental problems that we're faced with today. Mike spoke this morning about down south, without any real result on the part of the government. So, if I leave any kind of message to you, it's that we, as a whole, have to have more respect for Mother Nature, for the environment, and to leave it, to the best of our ability, the way that it was, the way that we found it. And that's the only legacy that we can leave for coming generations. I hope that you will think about that and I hope that all of us together can do something about those concerns.

Thank you.

DISCUSSION

UNIDENTIFIED

(Inaudible) would you see any contradiction between your request for baseline data and your response to the monitoring studies that are done, conducted both on the reserve, on the lake and in your example of the bear, whether you see a contradiction there, between the monitoring and your request for baseline data.

M. PICHE

I don't believe that there was adequate study done on the reserve because, if I remember correctly, one of the studies that was carried out, 3 or 4 years back, was done over the phone regarding our reserve. Those are not the kind of studies that we require. As to being contradictory, I really don't believe that we are because, like I say, the types of studies that are carried out, we've never been consulted or informed as to what we want on our land. And, like I said before, we, more than anybody, know that lake, though some hydrologists or whatever you call them might disagree with that, but I think we, more than anybody, know that lake and know our land, and know what it was like 5 - 10 years ago. And I think that information should be put together and information today costs money to put together, and we don't have the resources to put that together. And even if we did, would the government recognize that as baseline data? I don't believe they would, because they have to send their own scientists and other people to get all this information together. So, I hope in some way that I've answered your question.

Anyone else? I'm in a fighting mood.

NEIL SKINNER, PUBLIC WORKS

Wonder if you could comment on the report to the Privy Council on Indian self-government and the recommendations in there, and how that, those recommendations might affect your ability to be an intervenor in the broader sense

of the term, in terms of interacting with government and business, as an entity with legal standing, and fighting incursions into your environment.

M. PICHE

I am not sure that we can really speak in terms of having any kind of clout in environmental concerns. It's a little bit off the topic, but I will say that the proposed Indian self-government is something that I personally don't agree with because it's something that the government proposed. I didn't propose it. If he had come to me, to my band, and to a number of bands in the area, and said, "What do you want"? - we've been telling them for years what we want. Going back to the 1800's, we never gave up the right to self-government - never. We never gave up the right to self-determination. And we did not give up this land that the government owns. We agreed to share that land. That's all. We agreed to share that land and we agreed to let the settlers use the trees and the grasses for their livestock and to cultivate, to raise crops, trees to build their houses, and their barns and stuff, and we agreed all those things. But we did not agree to give up any part of that land. We agreed to share. We did not, we never gave up the right to govern ourselves. So how can anyone give me something that I already have, and have had for thousands of years - self-government, our own laws, our own way of governing ourselves, and our own religions, and all those things that were outlawed in the twenties and thirties. We have always had that; we never gave them up. So how can the government, in their largesse, give me self-government? It can't because I already have it, and never will give it up.

UNIDENTIFIED

One quick question, Marcel. The public participation process, I don't think, is a recent or a new concept within Alberta Environment and The ERCB, and their guide series. But it sounds, from what you were saying, public participation may not be working in the terms of the Cold Lake application. Is that correct?

M. PICHE

One of the ways that I feel it's not working is that, being a materialistic society, once those oil companies are given the go-ahead to build their projects, it means dollars for the local economy, to the local merchants, and for Edmonton, too, and for all of Alberta, and in the long run, all of Canada. So, there is a lot of, when subsequent hearings come up, no one gives a darn. They don't want to intervene because, the first thing is that almighty dollar, how they can make money from that project. They don't care about the environment, they don't care about social problems that, in this case, Cold Lake, Grand Centre, and the Cold Lake Indian Reserve will suffer. They don't care about them. They only care about the money their companies can make and they care about the spin-off industries that will come from those industries that locate in our area. So, public forums are good to a point but when people realize they can make a dollar, the rest don't mean a thing.

HANLAN ROBB SOUR GAS PLANT:

MITIGATION AND PUBLIC PARTICIPATION

MILLARD WRIGHT

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INTRODUCTION

Today I will confine my remarks largely to the biological aspects of mitigating sour gas development. Most of the paper will deal with the Hanlan-Robb area, but I will discuss mitigation at the Kabob and Pincher Creek plants as well.

When I use the term mitigation, I mean the actions that are taken to correct or lessen impacts associated with the pre-construction, construction and operations phases of sour gas production.

The Hanlan Robb plant is located in the foothills of Alberta, about 65 km from Hinton and Edson and 12 km from the Hamlet of Robb. The area is characterized by rolling forested countryside criss-crossed by numerous streams and rivers that form the headwaters of the Athabasca River.

The plant, which came on stream in February, 1983, has the capacity to process 300 million cubic feet per day of sour gas, producing 225 million cubic feet/day of sales gas and 1100 tonnes of sulphur. Four of eight fields currently supply gas to the plant through 200 km of pipelines. A sales gas line, 14-1/2 km of railroad and approximately 200 km of roads complete the facilities required by the plant. Mitigation of the impacts associated with these facilities will be the focal point of this presentation.

MITIGATION -- PRE-CONSTRUCTION/CONSTRUCTION

In order to talk about mitigation, we first have to identify the environmental impacts of the proposed project and assess their severity. At Hanlan Robb, we started addressing the potential biophysical impacts in 1978, with studies that were completed in 1981. These assessments were started two years before the decision was made to build a sour gas plant in the area. Similarly, the assessment of the social and economic impacts began in 1979, and continued until 1981.

Socio-Economic Impacts

After extensive study a site was ultimately selected for the plant, approximately 12 km east of the community of Robb (population of 200) and 65 km from Edson and Hinton (each with a population of 5,000). Regular discussions were held with individuals and groups in these communities, to aquaint them with the project, and to provide an opportunity for questions and answers. Project documents were circulated and discussed both before and after they were submitted to government as part of the application to build the plant and other support facilities. At all times we encouraged two-way communication, both with individuals and with groups.

This public participation process enabled us to identify many of the "softer" social issues that would require mitigation. For example:

1. Any new project generates local interest in the employment opportunities it provides. We found this interest with not only the local people of Edson, Hinton and Robb, but also the small native population in the nearby area.

   To address the employment issues, we examined the types of jobs and services that would be required, and then looked for the skills that would be needed to fill them. We were able to provide many contracts to natives such as for right-of-way clearing, clean-up and reclamation services. Local non-natives were more interested in

working in the plant and although the first opportunities for jobs went to employees at other Gulf plants, the company was committed to hiring local qualified individuals and training them if necessary.

2. Another issue arose from the fact that there is an active logging industry in the area, and many local people participate in harvesting and transporting the timber. Consequently, there were concerns that pipelines and railspurs would prohibit access to some of these resources and restrict movement of heavy equipment. To mitigate this problem, we worked with the main logging company, St. Regis and local operators to strategically place additional crossing points over our pipelines and railroads at no cost to the logging industry.

3. The area, in addition to supporting logging, also supports a number of registered trappers. These people were concerned about damage to equipment from pipeline and road construction. We agreed to inform the trappers of our construction plans, in advance, and further, to compensate trappers for damages when they had insufficient time to remove equipment.

4. The trappers were also concerned that the creation of new rights-of-way for roads, pipelines and railroads would grant off-road recreational traffic easy access to trapping areas. Consequently, we agreed to restrict access either by putting slash back on the right-of-way or creating physical barriers to these vehicles.

5. Conversely, recreationists were concerned that equipment moving to and from the plant would interfere with their activities. To deal with this issue, we agreed to limit heavy truck traffic to weekdays or nights when recreational traffic flow would be at a minimum.

6. There were other concerns among residents of Robb. Imagine you are an individual living in the hamlet -- a small, quiet community of

200. You might be concerned about the weekend traffic from a 700 - 800 person construction camp, to say nothing of dust that would be created. To address these issues, the company implemented dust control procedures, and agreed to bring in the RCMP for additional traffic control on Fridays and Sundays if required.

7. The local bar in Robb has a seating capacity of about 50 people. As you can appreciate, there was concern that construction personnel would reduce the opportunity for locals to "wet their whistle". In response, the company established a "wet" construction camp, and encouraged the construction people to use it rather than the Robb bar.

8. Because the plant is located in scenic foothills area of Alberta, many people voiced concerns about environmental protection. People wondered skeptically, "if Gulf would make commitments to get approval and ignore the commitments, once approval was granted". To deal with this issue, we appointed a full-time environmental inspector whose mandate from management was to institute the environmental protection measures that were necessary and would fulfill our commitments.

9. Finally, and not surprisingly, there was local concern about air emissions. The ERCB, stipulated that we recover a minimum of 98.3% of the sulphur, however, the plant was designed to recover 99% or more. Currently, our recovery rate is between 98.3% and 99% because the plant is operating at half capacity and consequently efficiency is down. When the plant operates at full capacity, we will meet or exceed 99%.

Biophysical Impacts

As I noted earlier, the project area is within the headwaters for the Athabasca River. There are many creeks and rivers with excellent water quality. Most streams support trout which is one of the reasons the region is a

prime recreation area. Therefore, the principal focus of mitigation from a biophysical perspective was water quality and fish habitat.

With 200 km of pipelines and an equal length of roads, much of our mitigation work was directed at preventing eroded soil material from reaching streams. Cross ditches, contouring and erosion bars were routinely used to intercept and direct silt-laden waters into adjacent vegetation where the silt would be filtered out before reaching the creek below. In some cases, ditches themselves were rock rip-rapped to protect soils from erosion. An equally strong effort was made to stabilize soils after removing vegetative cover. Rights-of-way were seeded as soon as possible, using helicopters and hydroseeders where access was difficult or the terrain was steep. Some unstable slopes were mechanically stabilized until a suitable vegetative cover could be established.

Constructing the pipelines and roads required 31 creek crossings of fish bearing streams. We used several techniques to minimize damage to fish habitat and degradation of water quality. Fluming, whereby the flow is directed through a pipe over the right-of-way enabling a dry cut and fill, was the preferred method. This technique, in addition to providing a dry crossing, enables stream-bed material to be carefully put back over the pipe so that when water is released, there is relatively little siltation and subsequent degradation of water quality.

In some instances, fluming was not practical or possible. For example, creeks with overhanging banks could not be flumed without destroying the banks. In these situations, we chose to trench up to the creek on both sides before removing the bank plug, then make the crossing and finally, restore the overhanging banks. Using this method, the negative impact on water quality was relatively short-term, while the banks could be re-constructed the same season. The banks were re-constructed as follows.

First, the vertical banks were re-formed and stabilized using crib walls made of local lodgepole pine logs (2 - 3 deep). The crib walls were held in place by cables extending back to anchors buried in the right-of-way. Next,

logs were laid side by side on the right-of-way and parallel to it, with the ends extending over the crib walls to create the foundation for the overhanging banks. The logs were then covered with soil from the right-of-way and seeded while grass, willows and small trees were transplanted along the overhangs. This resulted in revegetation of the soils on the right-of-way and banks by the end of one complete growing season with willows being well established by the end of three growing seasons.

In crossing creeks and rivers without overhanging banks, we simply put in crib walls to stabilize the banks of the right-of-way, planted trees and grass to enhance the revegetation and placed appropriate material back in the streambed. Consequently, visual and biophysical impacts were mitigated in a relatively short time. In fact, rainbow trout were observed spawning on one crossing, two months after it had been restored.

We were aware that more than fish and water quality could potentially be damaged by the project. One important archaeological site was also discovered. Frequently, pipelines are routed around such sites but in this case, the site was in the path of the railroad. Consequently, it was excavated and found to be an Athapaskin site about 3500 years old.

Finally, a paper on mitigating potential impacts of sour gas development would not be complete without some discussion of wastewater management. In this case, a number of ponds were constructed at Hanlan Robb, using both clay and impervious plastic liners to eliminate the risk of processor wastewater contaminating ground or surface water systems. To further reduce this risk, local shallow groundwaters flowing towards the ponds, were intercepted and pumped to a safe surface disposal location.

MITIGATION - OPERATIONAL IMPACTS

Sulphur Handling

I would like to turn now to impacts associated with operating sour gas plants, particularly sulphur handling. To study specific problems and

mitigative measures requires a look at the Kabob, Hanlan and Pincher Creek plants. Sulphur handling problems were experienced at the Kabob plant in the mid-70's. Like many sour gas plants in the Province, Kabob sulphur production, in excess of sales, was poured to block. To market the block sulphur, it was melted and reformed into slates -- a form more suitable for transport than broken sulphur, especially for the overseas market. Over time, the block-to-slating activities at Kabob resulted in a significant amount of sulphur dust being deposited downwind of the operation. Eventually the soils and surface waters became acidic and would no longer support vegetation, posing a serious reclamation problem. The area was cleared of dead vegetation and treated with powdered lime, applied by hose in areas accessible to trucks and compressors and by helicopters where ground access was difficult.

Concurrently, soil tests and plant growth trials were carried out using various combinations of lime, fertilizer and seed to see which combination was most appropriate for the damaged soils. The company was able to successfully revegetate this area and re-establish its productive capability -- but only after much work and an expenditure of 2 million dollars.

As you are aware, there has been a good market for sulphur in recent years and some sulphur blocks are literally "melting away". Some sulphur is shipped in the liquid form but a number of major producers now form it into prills, a form much easier to handle and one which is more stable during transport. One type of priller, the polish priller operates as follows:

Liquid sulphur from the sulphur plant or the remelters enters a tank at the bottom of a tower and is then pumped to the top. At the top, the sulphur passes through a grid and is formed into droplets that shower down the interior of the tower. As the droplets fall, they meet cool air forced upwards, thus solidifying them into round prills. The prills are collected at the bottom of the tower and conveyed to storage.

The air which is vented out the top of the tower, does entrain some small particles of sulphur and so the process is not completely dust-free. The prilling process, however, has greatly reduced the amount of dust generated

and improvements are still being made. Moreover, prills have been found to be quite stable during transport, and this has reduced the amount of dust generated en route to market. Prilling towers are currently in use at the Hanlan Robb, Shell Waterton, Gulf Strachan, Canterra Ram River and Kabob South plants. Other companies, such as Procor, use a different type of priller and provide a contract service to other producers.

There are approximately 45 sulphur recovery plants in Alberta, many of which do not have forming units. To market the sulphur from these blocks, it must first be remelted, because mechanical break-up of the block is discouraged by the regulatory agencies in order to avoid fugitive dust emissions. Remelting, however, is slow and expensive compared to mechanical breaking. At Pincher Creek a block was mechanically broken and trucked to its destination with no discernible impact on the environment. I would now like to describe how this was done and how the potential impacts were mitigated.

The block was moved from the Pincher Creek site to the Shell Waterton plant, a distance of about 18 km. The equipment employed in the break-up consisted of a backhoe, a front-end loader, an anemometer with alarm, 3 fog nozzles, 2 water cannons (with required pumps and hoses) and a fleet of 20 trucks. Each truck was equipped with a tarpaulin box cover in good condition. All tail gates were fitted with rubber liners and any other holes were repaired to prevent sulphur leaks. An anemometer with an alarm wired to sound at wind speeds of 30 km was placed outside the block on the upwind side. The water cannons were placed 15 - 20 metres downwind of the block approximately 30 m apart and facing one another. When in operation, the cannons provided an arching shower of water 10 m high and 30 m wide.

Using the backhoe break-up commenced in the middle of the block on the downwind side. Two workers with fog nozzles were placed on top of the block where they could spray and entrain any dust resulting from the block breakup. The loader picked up the broken sulphur and deposited it in a truck. During loading, the third fog nozzle was used to entrain dust emissions, and carry them to the ground. The water cannons were operated concurrent with break-up and loading to entrain any fugitive dust which was carried downwind. Once the

truck was loaded, it was covered and driven to a nearby washing pad where it was completely hosed down before leaving the plant. Another worker again checked the truck for leaking or exposed sulphur before the truck entered the highway. At the dump site the trucks were again covered, washed and inspected before returning for another load.

No break-up or loading was carried out when winds exceeded 30 km per hour outside the block. To further reduce wind in the loading area, the walls of the block were left standing until all of the interior of the block had been removed. All water from dust suppression and truck washing was collected in a pond and neutralized with the addition of powdered lime.

The operation was approved and inspected by the regulatory agencies. There was no discernible impact on the environment but there was a considerable saving of time and money.

Further, the operation resulted in a greater contribution to the local economy than would occur with remelting and shipping in rail tank cars.

In closing, I believe impacts associated with sour gas production can be mitigated with good project planning and enough lead time to identify and manage potential social and biophysical impacts. Public input is critically important to ensure that concerns are identified and dealt with before they become major issues. There is room for innovative thinking and creative approaches to problem solving. Finally, management must be committed to protecting the environment in concert with the development of sour gas resources.

DISCUSSION

UNIDENTIFIED

(INAUDIBLE)

MILLARD WRIGHT

Mark could give you a better idea of that, but my understanding is that while you can't eliminate it entirely, you know, you can certainly reduce it. In some cases we had to rebuild the gates three or four times but eventually go to drill pipes, but it worked. In other cases just putting flats back on the right-of-way eliminates a lot of that. So I think you can reduce it; I think you're really naive though if you think you're going to totally eliminate it.

EARL SNIDER

You made a comment about public input. Are you talking about public impact? Could you comment at any length about any monitoring in the program in terms of mitigations for both animal and human health?

M. WRIGHT

There are a number of monitoring programs that we've committed to, Earl, that I didn't want to touch on in here and that have now been implemented around the plant as far as, for example, aquatic systems, and air, that type of thing. The plant itself is encouraged to keep on with the community contacts that were made as part of the impact assessment process, so that we don't stop after we get the permits - an ongoing process to dialogue with these people and to see if there are new concerns there that arise from time to time. I believe that that is ongoing. Does that answer your question?

E. SNIDER

(INAUDIBLE)

How comfortable are you with that and do you think you really know what the impact is in terms of animal and human health?

M. WRIGHT

In terms of human health, I'm not sure that we know what the impact is. I'm not sure that it's right to assume that there is an impact on human health as a result of that plant. I think that there are still some things that are yet to be shown and certainly the announcement recently about Pincher Creek is designed to do that. The plant came on stream in February of 1983, so it's a little over a year. We're not aware of impacts, at least that we can identify at this point in time on animals in the area, but some of that may become evident as we compile better data.

UNIDENTIFIED

Do you find (inaudible) on animal health in the area?

M. WRIGHT

On animal health, no. There was baseline data in terms of numbers, distribution, migration behaviour, and that type of thing, but not on animal health.

UNIDENTIFIED

(INAUDIBLE)

M. WRIGHT

There is a base pad there. My understanding is that it is a washed gravel type base pad, Dave, assuming that if you poured liquid to block that it would solidify in the gravel and make it much easier to reclaim in terms of rebuilding that base pad and having the gravel settle out. There is not a concrete or an asphalt apron around the outside as yet; that I would like to see. Fortunately, we have not had to pour an awful lot of sulphur on the

ground to this point. I think there is probably a couple of inches at most - is that right, Mark? - over a portion of the area that we have prepared for base pad if we have to use it.

MARTHA KOSTUCH

What type of program do you use to identify the public concerns about your (inaudible) for example, the Rimby plant?

M. WRIGHT

Well, I don't think we can say, Martha, that we've had an active program of consultation with the community around Rimby. I think that if there were people at Rimby that had a concern, they could phone the plant and try to get an answer from the plant superintendent about that concern. More recently, when we have been intending to build an additional pipeline into the plant and tie in additional gas, we've gone into public meetings with anyone in the community of Rimby who is interested, has a concern, wants to know what the project is. We're concerned, prepared to have more of those if people aren't satisfied, still have questions, that type of thing. I think that of course you're aware, from community meetings that have been held with people in Rocky Mountain, you're instrumental in arranging some of those, there's been considerable effort also in the Pincher Creek area with regard to the problems we are encountering down there. Does that answer your question?

MIKE COOPER

I have a question - maybe you'd better hold onto the table there - I think you're to be commended for the approach you've been taking in Pincher Creek and the obvious difficulties (inaudible). I hope that the Board and Alberta Environment are monitoring the situation there closely because of what you're doing (inaudible).

M. WRIGHT

Thank you very much, Mike. That comment made the whole effort worthwhile. Anything else? Thanks very much folks.

THE SLAVE RIVER HYDRO PROJECT - MITIGATION PLANNING

GORDON PEARCE

Alberta Government Co-ordinator
Slave River Hydro Project
(Pre-Investment Phase)

INTRODUCTION

I am very pleased to have this opportunity to address the Symposium on Environmental Mitigation regarding the Slave River Hydro Project. During the next few minutes I will touch briefly on the following subjects:

1. A description of the Slave River and its hydro-electric potential;

2. The earlier Slave River Hydro Feasibility Study, completed by the Alberta Government in 1982;

3. My role as Provincial Government Co-ordinator for the Slave River Hydro Project;

4. The Overview Task Force Study, a comprehensive review of the 1982 Feasibility Study carried out by the two Alberta-based Utilities;

5. The Pre-Investment Phase; and

6. Mitigation and enhancement planning during the Pre-Investment Phase.

THE SLAVE RIVER AND ITS HYDRO-ELECTRIC POTENTIAL

The Slave River rises in Northern Alberta at the confluence of the Peace River and the Riviere des Rochers, which is the principal outlet channel from Lake Athabasca. The hydro-electric potential of the Slave River is

concentrated between Fitzgerald, Alberta and Fort Smith, Northwest Territories, a distance of some 25 kilometres. These communities are about 700 kilometres northeast of Edmonton.

The principal tributary basins of the Slave River are the Peace, which rises in British Columbia; the Athabasca, which is entirely within Alberta; and the Fond du Lac, which flows into Lake Athabasca and is entirely within Saskatchewan. The Peace contributes about 60 percent to the discharge in the Slave River, the Athabasca, about 20 percent, Fond du Lac about 10 percent, with the remainder from a number of sources.

Lake Athabasca and the Peace-Athabasca Delta are at the upstream end of the Slave River. The Delta is the largest boreal delta in the world and is an area of great ecological diversity. Most of the Delta is situated within Wood Buffalo National Park, the eastern boundary of which is the Slave River as far North as Fitzgerald.

Below Fort Smith, the Slave River meanders through lowlands and the Slave River Delta, to its outlet at Great Slave Lake.

The Slave River represents one of the few remaining prospects for major hydro-electric development in Alberta. The other major prospect is at Dunvegan on the Peace River, although Dunvegan would be technically more difficult, and also more expensive than the Slave. At present, thermal plants supply about 80 percent of all electrical energy used in Alberta. If the Slave River Project proceeds through construction, by the time it comes on stream about the mid-1990's it will represent some 20 percent of the total generating capacity in Alberta.

In order to place the Slave River Project in perspective, its capacity of 1800 MW is equivalent to the combined capacity of about five thermal units, or just under the capacity of the Sundance Plant on the south shore of Lake Wabamun.

A Slave River Hydro-Electric Project would be a 'run-of-river' development. In other words, the flow of the river would have to be passed through

the turbines, or else spilled. A run-of-river project may be distinguished from a development, such as the B.C. Peace River Dam, where the reservoir is large enough to store or impound excess water during the summer so that it can be released in winter for increased energy production.

THE 1982 SLAVE RIVER HYDRO FEASIBILITY STUDY

In July 1982, the Government of Alberta released the results of a "Slave River Hydro Feasibility Study". The four-year, $10 million study had been carried out under a Cabinet Directive, headed by the Department of Environment. The 37-volume study covered a number of engineering, environmental, archeological, social, community, economic, and financial subjects.

The July 1982 study stated that a hydro-electric facility on the Slave River Rapids appears technically and economically feasible. The study did not recommend a single preferred alternative for development. Instead, it narrowed the range of possible schemes to three alternatives: (1) Rapids of the Drowned adjacent to Fort Smith in the Northwest Territories; (2) Mountain Rapids; and (3) alternative 4, both of which are located up river from Fort Smith in Alberta.

As pointed out in the 1982 Feasibility Study, the province does not have the simple choice of pursuing development of a hydro-electric project on the Slave River or doing nothing. If the Slave Project does not proceed, electric supplies must be developed elsewhere, probably from coal-fired thermal power plants.

The 1982 Feasibility Study estimated that a Slave River Hydro-Electric development would cost about $8 billion in "as spent" dollars. (The Overview Task Force Report, which will be described later in my address, forecast a $6 billion captial cost based on a 6% per year inflation rate.)

When the Slave River study was tabled, the Government of Alberta announced its intention to agressively pursue the development of the

province's hydro-electric resources, and to ensure that project design work and other necessary consultation and approval steps were commenced immediately. At the time of the announcement, the then Utilities Minister, Larry Shaben commented that "the development of our hydro resources remains very attractive because the resources are renewable, such an operation is virtually pollution-free, and while initial capital costs are high, long-term power costs are stable and resistant to inflation".

THE ALBERTA GOVERNMENT'S SLAVE RIVER CO-ORDINATOR

At the time of the government's August 1982 announcement, Mr. Shaben stated that the government would appoint a project coordinator to assist in expediting hydro-electric development in Alberta.

Effective April 1, 1983, I accepted a three-year assignment to serve the Provincial Government as Co-ordinator of the Slave River Hydro Pre-Investment Phase. In this capacity, I report directly to the Honourable R.J. Bogle, Minister of Utilities and Telecommunicat ons, and am working with an inter-departmental committee of Deputy Ministers from several departments, including Utilities and Telecommunications, Environment, Renewable Resources, and Federal and Intergovernmental Affairs. As Co-ordinator, I serve as the principal Alberta Government contact with the utility companies, local communities (such as Fort Smith and Fort Resolution in the Northwest Territories, and Fort Chipewyan in Alberta), environmental interest groups, other Provincial Governments, and the Federal Government Co-ordinator.

OVERVIEW TASK FORCE

In late 1982, the Alberta Government invited the two investor-owned utilities operating in the province -- TransAlta Utilities Corporation and Alberta Power Limited -- to participate in the pre-investment phase of the Slave River Project.

Prior to initiation of the pre-investment phase and with the full knowledge and concurrence of the Alberta Government, the two utility companies set

up an Overview Task Force to carry out a detailed review of the 1982 Feasibility Study, and to prepare a plan and schedule of ongoing field investigations and studies that would be required as part of an application for approvals to construct a dam on the Slave River, assuming such a step is warranted.

The final report of the Overview Task Force Study was submitted to the Alberta Government in late August 1983.

THE PRE-INVESTMENT PHASE

The two utilities and the Alberta Government have reached agreement relating to their joint undertaking of the Pre-Investment Phase. Under such an agreement, the total costs of the Pre-Investment Phase are being shared equally between the three sponsors.

The Pre-Investment Phase is administered by a full-time Management Committee, consisting of a senior management representative from each of the two utilities and myself. We report to a Policy Committee consisting of the C.E.O.'s and top financial officers of both utilities, plus Mr. Bogle and the Deputy Minister of Utilities and Telecommunications. The Management Committee operates an Information Office in Fort Smith, with additional representatives in Fort Resolution and Fort Chipewyan. These representatives are long-standing residents of these three communities.

During 1983, the Management Committee awarded a number of contracts covering a variety of subjects, including:

- an Ice Study,
- a Lamprey Study,
- Topographic & Bathymetric surveys,
- a Fall Fish Spawning Survey,
- an Archeological and Historic Resources Assessment,
- a Migratory Bird Survey,
- a Mammal Study, and
- a Piezometer Maintenance and Monitoring Program.

Most of these work packages have been undertaken in order to take advantage of favorable weather and river conditions in the project area.

In late 1983, the Policy Committee decided to change the order of priority for certain work packages. Top priority was given to studies of financing/rate levelization alternatives designed to reduce adverse early-year power costs.

As part of these financing studies, the Management Committee is evaluating the potential for the export of electric energy from Alberta during the early years of a Slave River Project's 70-year economic life, at a price which would provide benefits to Canadians. Exports might occur for a period up to 20 years.

The overall financing and export potential studies are expected to be completed by mid-1984. The completion of the Financing Task Force and Export Studies will be a major "go-no-go" decision point as far as further work programs are concerned.

If the decision is to proceed, terms of reference for a number of work packages will be published over the following two to three years. The first work packages would relate to a project consultant (or consultants) who would have responsibility for managment of the overall study program leading to application for permits to construct a dam on the Slave River, and for execution of a package of engineering studies related to selection of the preferred site and the design of the hydro-electric generating facilities.

Expenditures estimated at $40 million may be required for about 50 separate contracts for engineering, management, environmental, financial and socio-economic studies. A proponent or proponents would have to be selected prior to making such application, and this will be the next major decision point.

A further two or three years may be required for the regulatory authorities to hear an application from a proponent and to reach a decision.

If necessary approvals are received, the construction phase would take a further seven years, putting the dam in full operation about the mid-1990's.

It should be emphasized that, at this point in time there is no commitment by the Government of Alberta or the two utilities to the construction of a hydro-electric project on the Slave River. There is no development proponent. If at any time during the Pre-Investment Phase it becomes evident that the project does not make sense for some combination of technical, economical, environmental or socio-economic reasons, the work will be stopped.

MITIGATION AND ENHANCEMENT PLANNING DURING PRE-INVESTMENT PHASE

It is appropriate to make reference to the environmental process which must be met by any proponent. Inevitably a project as large as the Slave River development will change the local environment and these changes must be balanced against the long-term power requirements of Albertans, and, in my view, must be compared with the environmental changes resulting from thermal-electric developments. A proponent must meet Alberta's environmental impact guidelines which look at broad environmental and social impacts of the Slave Project. In addition, the Federal Environmental Assessment Review Office ("FEARO"), which reports to the Federal Minister of the Environment, will be assessing the impact of the project on areas of Federal jurisdiction. As I am certain you all know, the FEARO panel for the Slave River Project held public hearings in 1982 to obtain input to Federal Environmental Guidelines for the Slave Project.

On April 18, 1984 - less than one week ago - the Alberta Department of Environment and FEARO released Draft Information Requirements for Enviornmental Impact Studies relating to a Slave River Hydro Project. The combined information package totals over 60 pages - single spaced. These two levels of government, plus Saskatchewan and the Northwest Territories have agreed to co-ordinate their environmental review processes for the project and integrate the information they require from a proponent. Such coordination will eliminate duplication of effort and facilitate the review of the project by governments and the public.

Once a proponent is identified - or it becomes clear that a Slave River Hydro-Electric Project will proceed toward a hearing process, the Alberta ERCB and FEARO will carry out a public consultation process to refine information needs against a more clearly defined project description. To facilitate this public consultation process, it is my understanding that a single integrated ERCB/FEARO document will be developed.

Subsequently, a final integrated information requirement document will be prepared which will be used by a proponent to prepare the required application for review at a subsequent public regulatory hearing in which all jurisdictions would be involved.

Both the draft Alberta Guidelines and the FEARO guidelines deal with the questions of mitigation and enhancement. The Alberta Guidelines call for the proponent to describe the manner in which the applicant proposes to mitigate perceived impacts, as well as any opportunities that are recognized for enhancement of effects deemed beneficial. Proposals for monitoring the construction and operating phases to ensure satisfactory performance in accordance with the mitigation and enhancement proposals must also be described. The Alberta guidelines cover mitigation and enhancement of the physical, biological and socio-economic environment, and residual adverse impacts.

Generally-speaking, the FEARO guidelines seem to cover the same mitigation and enhancement matters, albeit in somewhat greater detail than the Alberta guidelines.

Obviously, a Slave River Hydro Project proponent will have to meet the final Alberta EIS and FEARO guidelines. If the project proceeds through to application, a significant portion of the estimated $40 million budget will be spent on environmental and socio-economic studies.

We are in the very early stages of the Pre-Investment Phase, and yet the sponsors, in my opinion, have demonstrated their commitment to mitigation planning by actions taken so far. For example, one part of the FEARO

guidelines (under the subheading "Local Business, Industry & Employment", "Education Training") refers to:

- plans to give local businesses and industries early notification and encouragement of business opportunities;

- effects of project demand for labor on the local and regional labor force;

- access by northerners to employment opportunities.

During Managment Committee visits to the communities of Fort Smith, Fort Resolution, and Fort Chipewyan, and from advice received from our Information Office representatives in these three communities, in the area of socio-economics northerners seem to have the following major interests, as far as participation in the Pre-Investment Phase studies:

- employment opportunities for local people,

- business opportunities for local firms to supply goods and services,

- adequate advance notice of such labor and business needs,

- input to the terms of reference for specific studies, so that important local knowledge can be built into such studies,

- training programs far enough in advance so that northerners will have employment opportunities during construction and operation of the dam.

We have been quite successful in meeting these first four objectives relating to studies which have already been awarded. If we proceed into the application phase, there should be ample time to work with various levels of government regarding the job training needs.

I believe mitigation planning steps will be taken by the management committee in the physical and biological, as well as the socio-economic environment, as we move through the Pre-Investment Phase - in other words, well ahead of construction and operation of the facility, if indeed we proceed to those phases.

The study group have made the decision to provide copies of all studies, which could become part of an application, to the public, as they are completed. In fact, this has already happened in the case of several of the studies initiated last year.

Each of the three sponsors of the Pre-Investment Phase - the two utilities plus the Alberta Government Coordinator's office have environmental and socio-economic specialists within their respective staff organizations, plus outside advisors and the Northern Information Offices. In the case of the Coordinator's office, we also have access to the Department of Environment, the Native Secretariat, the Northern Alberta Development Council, and Alberta Culture. These specialists can be of material assistance in identifying issues requiring study as part of the Pre-Investment Phase.

We have a great deal of data to utilize as the basis for more in-depth studies, particularly the detailed studies undertaken as part of the 1982 Feasibility Study.

In my opinion, our management team is already committed to attempting to solve or reduce environmental and socio-economic impacts as they are identified, at a very early stage recognizing that if applications are made and approved, construction is not likely to start for about 5 more years.

Some of our environmental concerns relate in particular to: White Pelicans which inhabit rocky islands near the proponent's damsites, the Whooping Cranes, which nest some 60 to 80 miles from the Rapids, and the Buffalo located in the National Park.

These and other environmental matters such as the impact of the dam on Fish-Spawning Habitats, Migratory Birds, Fur-Bearing Animals, and the

Peace-Athabasca Delta will be studied carefully during the Pre-Investment Phase.

SUMMARY

In summary, the Slave River represents one of the few remaining prospects for major hydro-electric developments in Alberta. If the development goes through to the construction stage, it could represent the largest major project to go ahead in Canada during the next decade, with significant long-term social, environmental, and economic benefits to Canadians.

As you will appreciate, there are many risks associated with a proposed development as large and complex as the Slave River Hydro Project. In this regard, it is no different from most major projects and it is for this reason that the Pre-Investment Phase is being undertaken so carefully by the utilities and the government. As indicated at the outset of my talk, it is not a question of the Slave or nothing. If the Slave does not go ahead, alternative sources of electricity in the Province must be developed.

In my opinion, the Study Group has already demonstrated its commitment to mitigation planning - even though we are in the very early stages of the Pre-Investment Phase and recognizing that start of construction - if we proceed to that stage, is at least 5 years away and operations 12 years away.

DISCUSSION

UNIDENTIFIED

I would like to know why Alberta could not purchase the electricity from outside its boundaries, as many American states are doing from provinces that do have an excess of hydro-electrical capacity.

G. PEARCE

I think there's the opportunity to perhaps do that in the very short term, assuming you have transmission facilitites that will enable you to do that. But in the longer term, relying on outside sources might mean that we would only have that outside capacity for a relatively short period of years, because of the needs within those other areas.

UNIDENTIFIED

That, presumably, would also be the case, for instance, in the State of Minnesota, which is going to buy more power from Manitoba than they presently do, and I was encouraged that that response might come back, that if Americans are willing to purchase power from Canadians, why can't Albertans also purchase power from other Canadians and make that sort of long-term commitment that Minnesotans and people from Wisconsin and North Dakota are doing with Manitoba?

G. PEARCE

Well, I don't know the details of that Manitoba-Minnesota contract. It was only announced within the last week or so. My guess is that it would be for a period of time perhaps not to exceed 20 years, so if we imported power from some other political jurisdiction, British Columbia, for example, we might only be able to have that power available to us for a relatively short period of time.

UNIDENTIFIED

One comment, and then a question, in follow-up to the previous questioner. I agree that our only alternative is not to develop a coal-fired generating plant within the province. We can look at importing power. We can also look at reducing our power requirements. A question is, how successful have you been in finding markets in the United States for the power? I realize you've recently been down there looking at markets. And secondly, what is Alberta's policy regarding export of power to the United States?

G. PEARCE

To answer your first question, we are just in discussion stages with various utilities in the United States, and we also have some outside consultants working on the potential for exports for the 10-year period or whatever it would be during the early part of the economic life. So we have no firm data available at this point on the export market. We have been down there and will be going down again. We're targetting, as I mentioned, to have those studies finished by about the middle of the year. O.K., now, sorry, the second part of your question?

UNIDENTIFIED

What is Alberta's policy?

G. PEARCE

Okay, the Alberta government has, as I understand it, approved the short-term export of (inaudible) power from hydro-based projects. In other words, they would not, as I understand it, look favourably on a new coal-fired development to export power for its full economic life.

MILES CONSTABLE

I was wondering, how long will it take for this dam to pay for itself if it is built?

G. PEARCE

Well, that - I don't have an answer to that particular point at this time. That will become evident from the financial studies when they're completed, but certainly, just looking at in a little different way, perhaps, the initial feasibility study indicated that, on a present worth basis, the net benefits to the province, in other words, the gross benefits less the costs of this project, are positive by a significant number. Don't ask me what the number is, I can't give it to you. It's public, though.

M. CONSTABLE

I have another question. What is the cost of five coal fired plants equal to a generating capacity of this dam?

G. PEARCE

It would be the capital cost per unit of capacity, would be significantly lower than the capital cost of a hydro project. But you have to remember that once your hydro project is constructed, you have virtually no cost. In other words, you have no raw material costs like you have with the thermal projects, either coal or whatever, gas, in the case of natural gas.

UNIDENTIFIED

I was wondering, having come from Ontario recently, the problem that Ontario Hydro has had with its power generating schemes, that are based primarily on 1974 statistics?

G. PEARCE

1974 what?

UNIDENTIFIED

I believe it was based on 1974 statistics of demand - power demand for Ontario. They are presently locked into a rather expensive program of, well in their case, nuclear development. I was wondering, wouldn't it be more sensible to have a flexible system of, say, developing coal-fired plants rather than one large development? If in the next 30 or 50 years if it becomes apparent that we won't need the entire capacity of that dam, there aren't markets for it, wouldn't it be reasonable to construct three, say coal-fired plants rather than one large plant that won't be operating at capacity?

G. PEARCE

Well, that's certainly part of the whole study that we're looking at, and it goes back to the comment that was made earlier about conservation. As part of this whole reassessment, we're looking at the long-term demand figures and the optimal generation sequence to meet that demand. And most of the published studies on demand go out about 20 years and the demand figures that are being published now are lower than the demand figures that were published at the time of the feasibility study and that's one of the variables that we're looking at very carefully.

UNIDENTIFIED

(Inaudible)

G. PEARCE

You mean through the Alberta interconnected system?

UNIDENTIFIED

(Inaudible)

G. PEARCE

Are you speaking now of the export market or to the domestic? It would, that would depend on whether it's an AC line or a DC line, but I think you could probably assume that it would be tied into the Alberta integrated system if it was an AC line.

COAL MINING AND ENVIRONMENTAL MITIGATION

MALCOLM K. ROSS

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Crows Nest Resources, Ltd.
Calgary, Alberta

While I was reviewing the Proceedings of the 1982 Symposium, I was particularly struck by the statement of the rapporteur, Stu Smith, to the effect that, throughout the papers, there was a lack of a critical element.

To criticize, according to the Oxford & Webster dictionaries is "to consider the merits and demerits of and judge accordingly": a secondary meaning is "to stress the faults of". Unfortunately, in contemporary use, "to criticize", tends to be used in the latter sense.

In this paper, I had intended to critically review mitigation. As defined, "to mitigate" is "to alleviate, to moderate or to reduce the severity of".

My attempt to review mitigation, however, led me to study other factors with which mitigation is inextricably linked. This paper discusses these studies and their conclusions.

I must offer a note of caution; those who staunchly advocate either the status quo or a particular point of view should not, in my opinion, staunchly advocate critical reviews. Things, as they say, are not what they appear to be, and the outcome of a logical, objective, i.e. critical, review, may not be acceptable to the initial proponents of the review. I use the work "initial" deliberately. This apparent digression will become germane later.

The definition of mitigation implies that something has happened. In the context of this symposium, an environmental impact. Impact is one of those two edged words; impacts may be positive or negative. In much contemporary

use it is assumed to be negative. In an attempt to avoid this misunderstanding I prefer to use the word effect, and talk of environmental effects which may be positive or negative. One problem with the etymological understanding, or definition, of mitigation, is that it does not include a very important operational, in the environmental management sense, definition: avoidance of an effect.

These effects, or potential effects, are those which have been identified by prior study in the environmental impact assessment.

We can consider mitigation as problem solving which occurs after problems have been identified. Speaking of problems, I have a favorite poem, which puts into perspective this particular dilemma.

'On Problems'
Our choicest plans
have fallen through.
Our airiest castles
Tumbled over.
Because of lines
We neatly drew
and later neatly
Stumbled over.

To extend my understanding that mitigation is an exercise in problem solving I turned to the literature for help. I concluded, following this, that mitigation is not that glamorous a topic. Mitigation, from my limited research, is not addressed with the energy that it deserves. Those texts which do stress mitigation address techniques for mitigation, i.e. how to reclaim soil, how to revegetate, how to rebuild streams, how to use islands of plant communities, how to build dykes, dams, berms, ponds, how to propagate vegetation, how to construct for protection of drainages, gulleys, and banks from rock falls, wind, snow and avalanches. I can continue, but to save time I will refer you to an excellent text, translated from the German of Hugo Schiechtl, sponsored by Alberta Environment, published by the University of

Alberta Press in 1980. It is titled "Bio Engineering for Land Reclamation and Conservation". This is a world wide appreciation of environmental mitigation techniques - essentially, an environmentally sensitive engineering technology using biological materials as well as physical materials.

A multitude of texts, pamphlets, and hand books from Canada and the United States exist describing practical techniques successful in our particular ecosystems. These texts usually are titled "Reclamation" or "Environmental Protection" but describe mitigation techniques.

Now, how do I address mitigation if mitigation is restricted to the utilization of engineering and technological methods which are, in most cases, known. There is, obviously, tremendous opportunity to develop new and innovative methods to mitigate negative effects on the environment and, as well, to solve those problems for which present technology is inadequate.

What do others say?

Beanlands & Duinker in "An Ecological Framework for Environmental Impact Assessment in Canada", published by Dalhousie University and the Federal Environmental Assessment Review Office in 1983, sponsored by the Arctic and East Coast Petroleum Operators Association, The Canadian Electrical Association, Dalhousie University and Environment Canada, reviewed 21 environmental impact statements and the regulatory guidelines for preparation. (Slides - Lists of E.I.A.'s reviewed). Subsequently, another 13 environmental impact assessments were reviewed.

In the conclusions to the brief chapter which outlines the results and discussion of these reviews, mitigation was not mentioned. In the brief discussion of results it was mentioned. Following, is the entire paragraph:

> MITIGATION
>
> Most of the assessments reviewed emphasized the mitigation measures to be adopted to reduce or eliminate undesirable impacts. Major sections of the reports were devoted to the mitigation of impacts or such discussion permeated the chapters dealing with impact

> prediction. In the majority of assessments, it was clear that few of the studies undertaken had contributed to the identification of suitable mitigating measures. Most of the measures described included well known mitigation techniques, as well as elements of sound environmental planning and construction practices.

In other words, sound mitigation techniques were included in the E.I.A. but they were not connected to the baseline information or to the chapters which were presumably predicting impacts.

In the conclusions to this chapter Beanlands & Duinker continued:

> The collection of baseline data was almost universally recognized in guidelines and impact statements as the starting point for field studies. Seldom, however, did the approach taken attempt to establish a statistical basis for use in the prediction of impacts and the development of a monitoring program. Predictions were commonly vague, of questionable value both for decision making and for studies to test them.

In the section on predictions that were contained in environmental impact assessments, the following was written:

> It is difficult to see how such non-commital predictions could assist the general public and the review agency to assess the nature, extent and probability of environmental impacts, and subsequently come to a reasoned decision regarding the acceptability of the project.

On the basis of these comments, it appears that while mitigation of actual impacts and the prediction of those impacts are related to both the decision making process and the environmental impact assessment process this link is not being made.

It is important to remember that the environmental impact assessment process identifies potential effects, it does not decide. The E.I.A. should be a tool used to facilitate decision making.

Let us look at several models of environmental impact assessment that were discussed by Beanlands and Duinker (Figure 1).

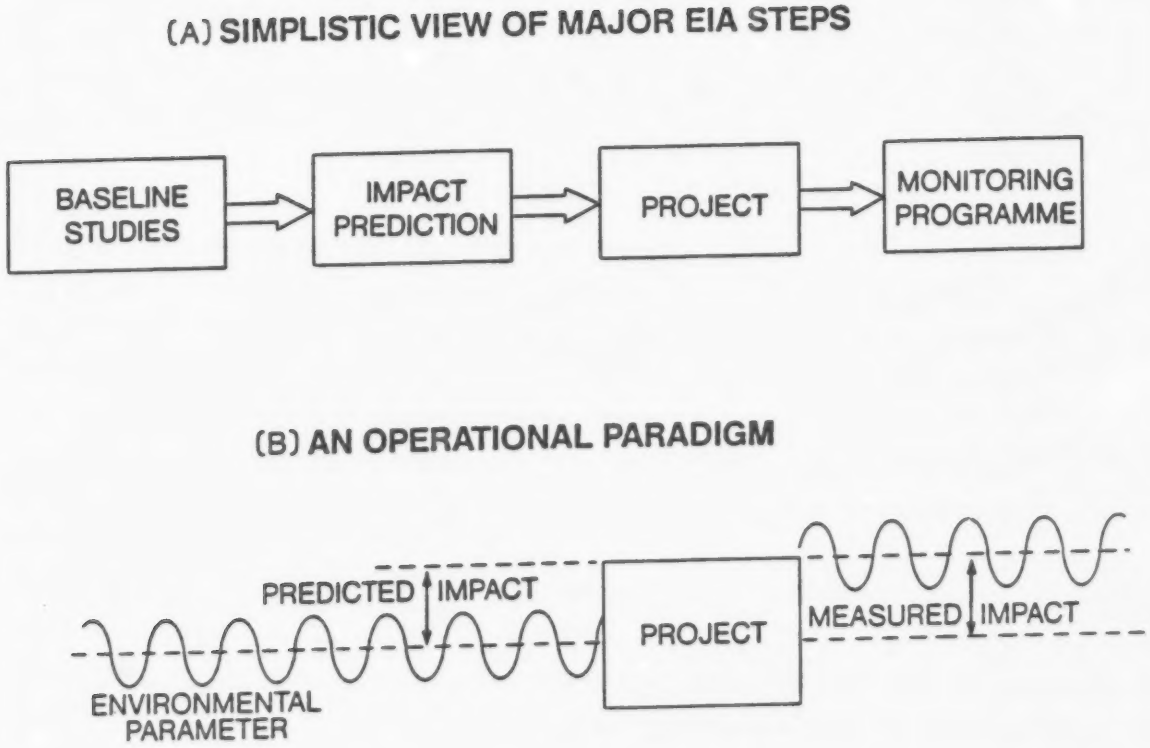

Figure 1: Evolution of impact assessment paradigms, A and B.

A. outlines the environmental impact assessment process as taking place in sequential fashion prior to the implementation of a project and with a monitoring program following commitment of that project.

B. is an operational paradigm which implies that the implementation of a project will necessarily create a change in an environmental parameter and that the measured impact after the project may or may not be equivalent to that level of effect which was predicted prior to the implementation of the project.

In Figure 2,

C. reflects the E.I.A., or the project, as an experiment. Baseline studies are done with initial hypotheses put, and subsequently tested following the project perturbation. Note the lower line; this reflects project development by a company. Note also that the E.I.A., hypotheses development, measurement, hypotheses testing, and assessment are represented as a line parallel with project development.

With regards to actual decision making, the inference to be drawn from the last quotation is that decisions are made following E.I.A. prediction only by the general public and review agencies. The quote being "it is difficult to see how such non-commital predictions could assist the general public and the review agency to assess the nature, extent, and probability of environmental impacts and subsequently come to a reasoned decision regarding the acceptability of the project".

Because of the isolation of the E.I.A. process reflected in Figure 2, the impression has developed that companies do not include environmental information in the decision making process.

This impression is wrong. Companies do, and the trend for this is continuing - environmental information, early determination of potential effects, enhanced ability to mitigate, and consideration of these parameters early in

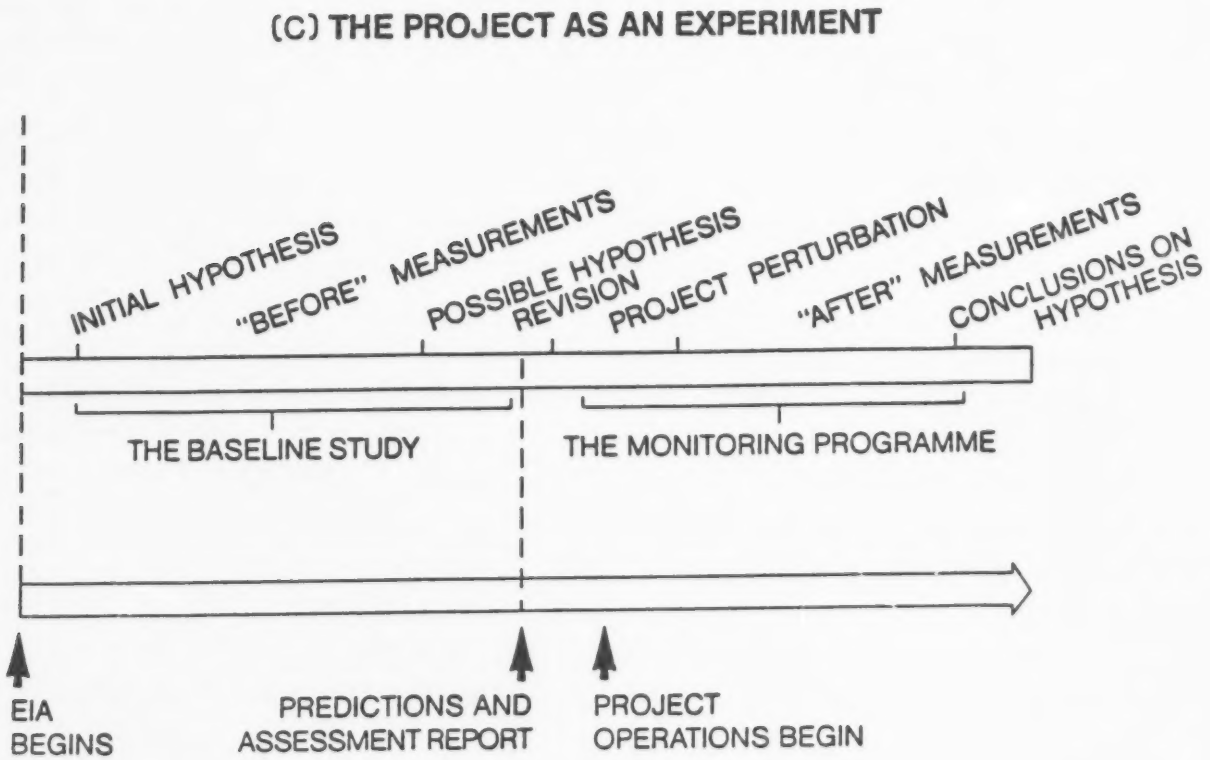

Figure 2: Evolution of impact assessment paradigms, C.

the planning process are now becoming commonplace in the decision making process in companies.

As an example, in Alberta, incorporation of water policies as an administrative and operational responsibility of mining companies is evidence of the progression of acceptance by companies that groundwater in coal seams is important to rural industry, in the short-term and the long-term, and has to be addressed in mine planning.

An operational analogy that I would like to draw is that of health and safety. A century ago, it was acceptable for adults and children to be employed in coal mines in terrible conditions. (Slide - Crows Nest Pass Coal Company accident book, 1912). A movement to improve the situation, starting with a few concerned people, grew, and today we have health and safety as one of the primary elements of the operating philosophy of a coal mine with standards maintained by government regulatory agencies. In my opinion, this is comparable to the movements which have grown from singular voices in the 1960's, and earlier, with regard to environmental protection in industrial development. These major movements have now affected operating philosophy. It is my opinion, that as with health and safety, in the future, environmental protection and mitigation will be as closely interwoven with mine operation as health and safety.

At Crows Nest Resources Limited our thoughts along these lines were crystallized by a draft of a paper by Bert Webber of Western Washington State University. In this paper he addresses the various stages of evolution of an integrated approach to development, using "bubble diagrams". We, however, have modified and added to the titles in the bubbles to reflect our understanding and, perhaps, our biases (Figure 3).

Stage I describes the structure of project planning up to aroung the 1950's and early '60's. This stage could be equally well characterized by reversing the order of the "bubbles". It is also significant that this era was one in which large projects of a more political nature were committed for motives of national prestige or desire to accelerate the growth of

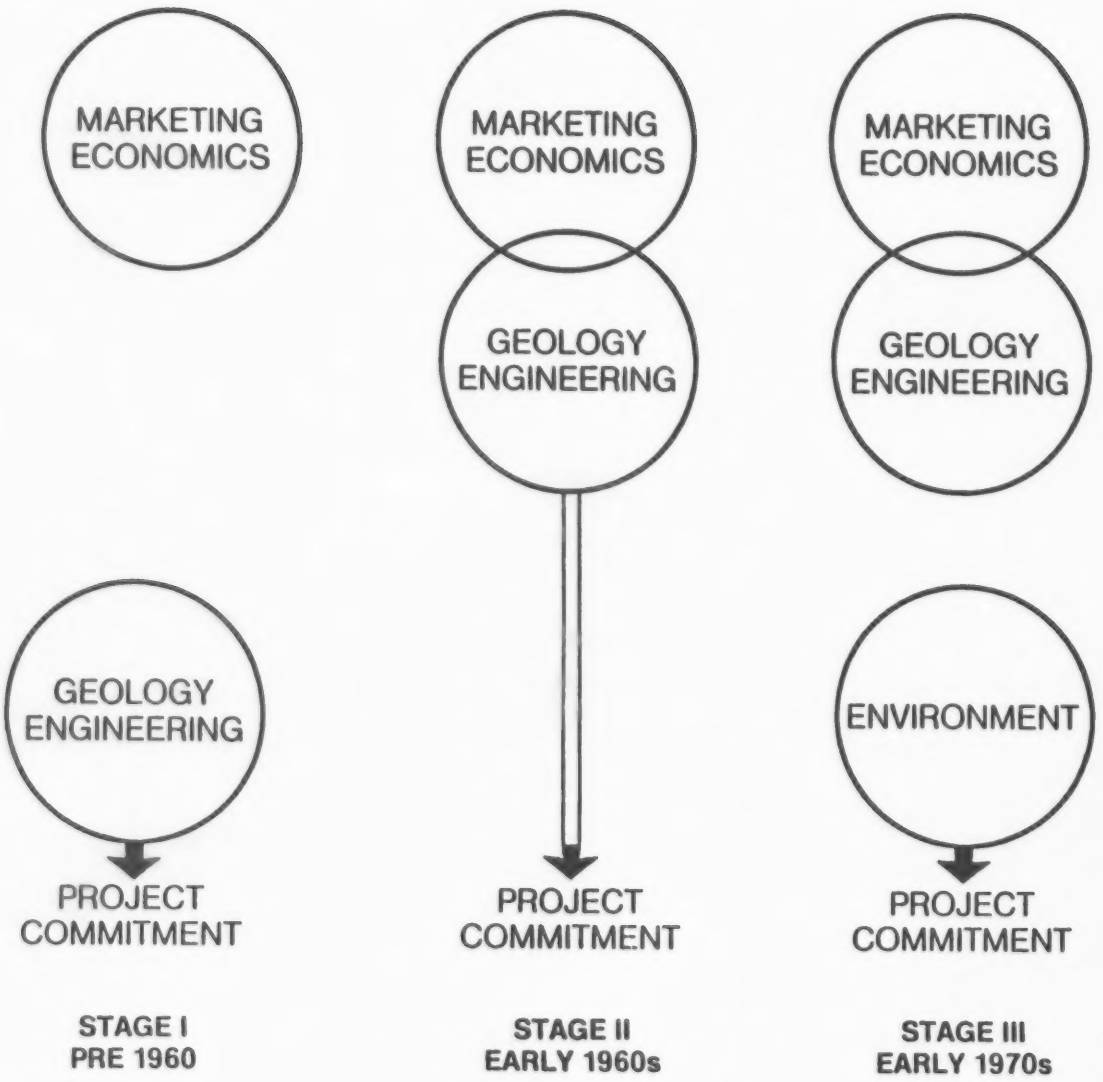

Figure 3: Evolution of integrated development planning, stages I - III.

"underdeveloped economies". Sometimes these had only a tenuous link to economics, markets or the technical disciplines.

Stage II developed during the 1960's partially due to the need to more efficiently manage the mega-projects.

As a result of the impacts of large projects specifically, and the developed nations increasing industrial activities, concern for the environment did begin to factor in project planning by the early '70's but still more as a cosmetic afterthought and usually in operations (Stage III).

Stage IV (Figure 4) shows the process in vogue in the late '70's, with the addition of public involvement reflecting increasing public pressure to have some say in projects impinging on their lifestyle. However, the process is still sequential. Lastly, Stage V represents the process towards which we are evolving in the 1980's with all components fully integrated from the earliest stages of the development process. The interlocking of the three bubbles also implies that the project group is an inter-disciplinary team of specialists who understand and "buy-in" to the concept of integrated mine development.

This team must serve two masters. The first is the company executive, who must be convinced that, in the uncertain world of mining and selling coal, the project is soundly conceived and that future risks have been sufficiently accounted for to provide the degree of confidence that a decision can be made.

The second master is government, who must also have sufficient information to assess the project and decide whether or not, on the basis of aggregate benefits and costs, society in general will benefit if the project proceeds.

Integrated development planning, is the task of identifying, measuring and understanding all of the resources, their constraints and interdependencies. The objectives are to provide a rational and consistent format for decision making and, in the successful cases, a basis for ongoing operational designs.

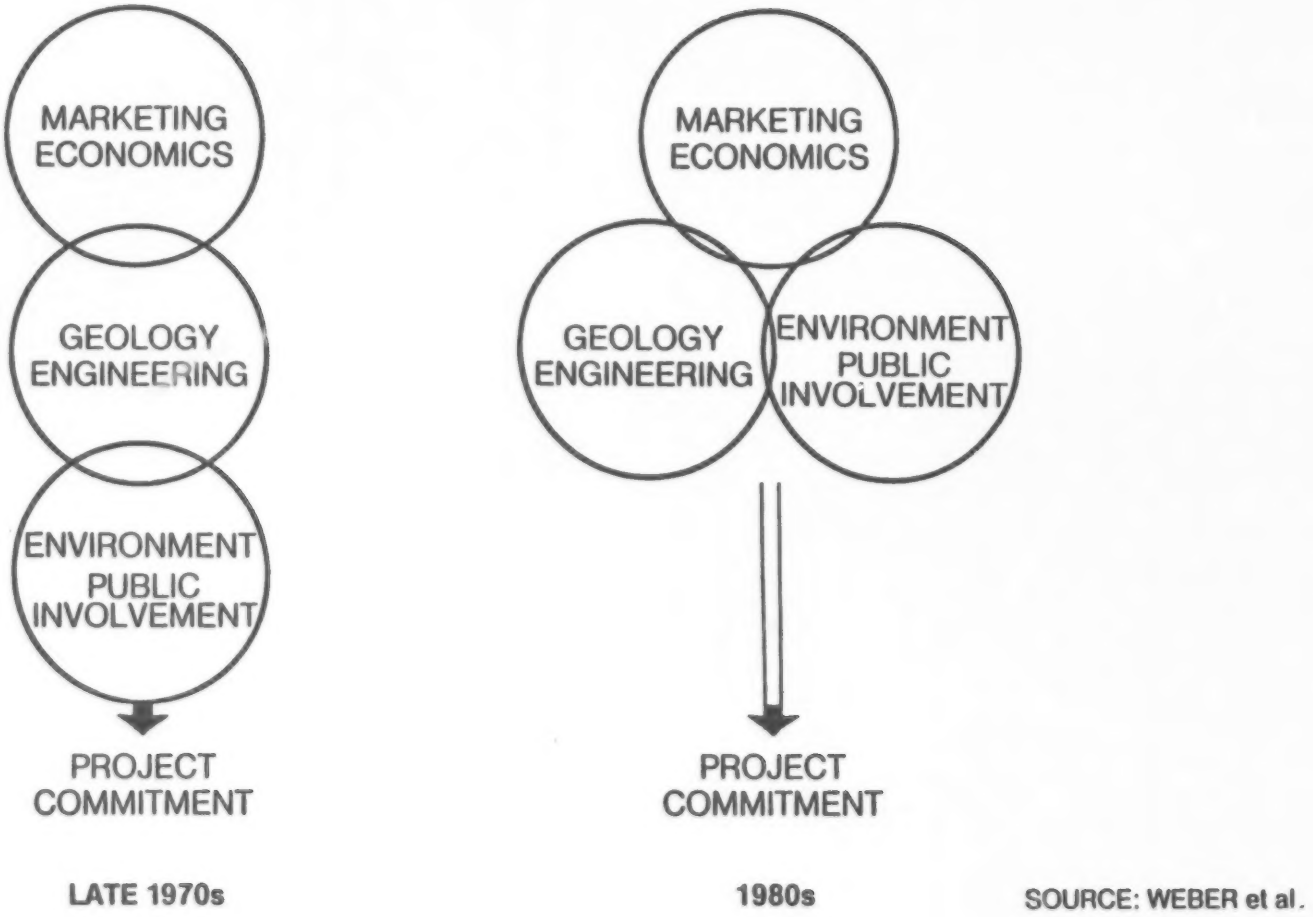

Figure 4: Evolution of integrated development planning, late 1970's and 1980's.

In conversation with Webber he offered the opinion that mitigation is "unfortumately included as a condition not as a part of the process" and that "one of the major problems in our (that is the U.S.) system is that there is no clear forum in the assessment process in which mitigation can be addressed and evaluated as it is subsumed under the permit processes". He also indicated that "mitigation is only contentious if poor planning occurs". He indicated that the bubble in the 1980's diagram should be interpreted "in the broadest context", as shown in a succeeding slide (Figure 5).

In this slide we have limited the title in the bubble to Environment in the broadest definition of that word. This "bubble", in effect, is a multitude of "bubbles" (Figure 6) biophysical environment, socio economic environment, mitigation, public involvement, government involvement, reclamation and others on which a project may impinge. For example, a petro chemical complex on a coast may have to consider transportation methods.

The concept of integrated development has been explained. Implicit in this concept is an understanding and commitment by all members of the planning and development team that they are coal miners. I am a coal miner with particular disciplinary skills which enable me to supervise, on behalf of the company, those aspects of coal mine development which are environmental in nature. This does not diminish from my commitment to the environment. On the contrary, it ensures that environmental matters are fully accounted for in the decision making process.

The planning, development, operation, and reclamation of a large bulk coal sample programme may be considered as an encapsulated example of full scale mine development with attendant identification of effects and mitigation requirements.

At Telkwa, in northern B.C. (Slide - Telkwa panorama) Crows Nest Resources Limited excavated two test pits in an area 1000 x 70 m (Slide - Open Test Pit). Potential environmental effects were identified and mitigation measures were designed for these pits. After coal was sampled, the pits were backfilled. During backfilling and reclamation, experimental reclamation

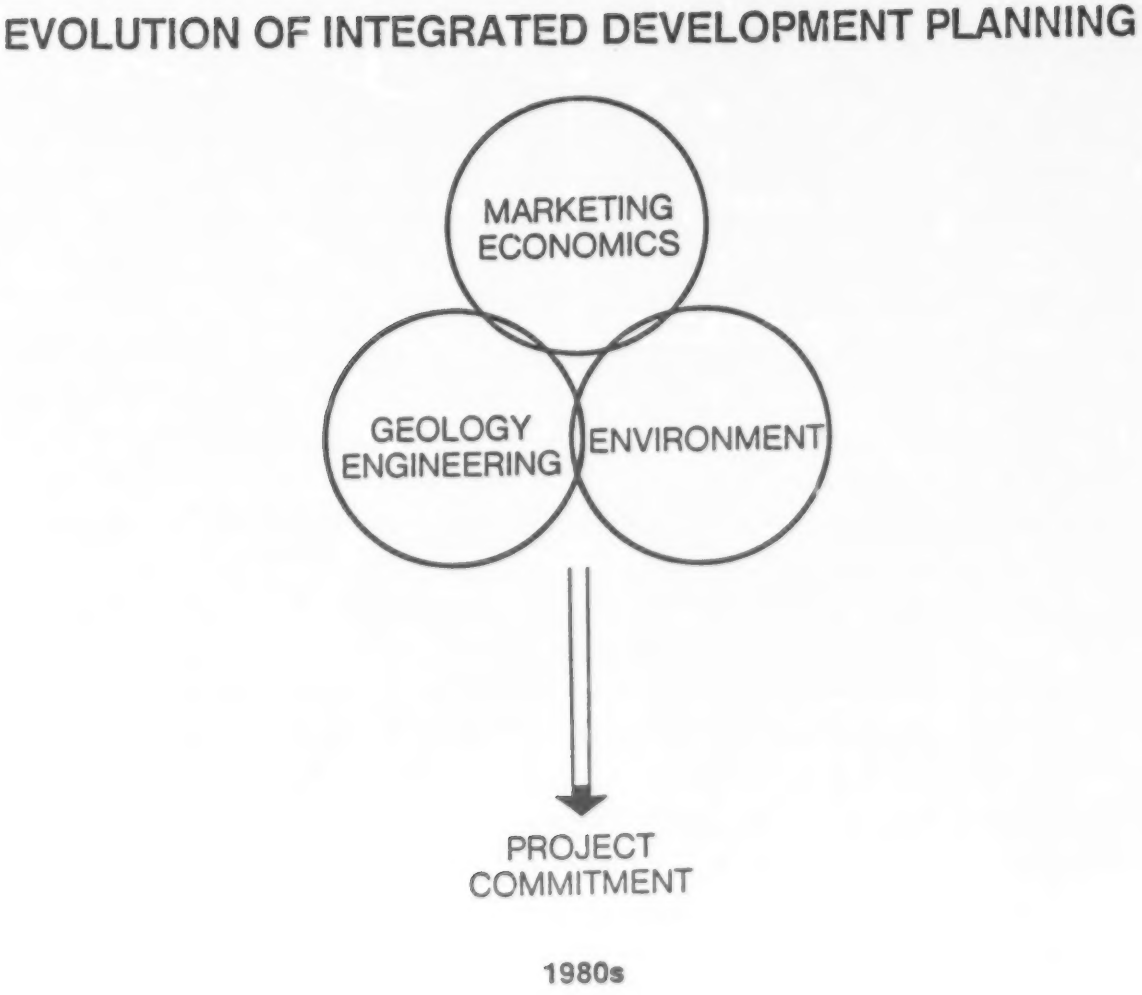

Figure 5: Evolution of integrated development planning, 1980's.

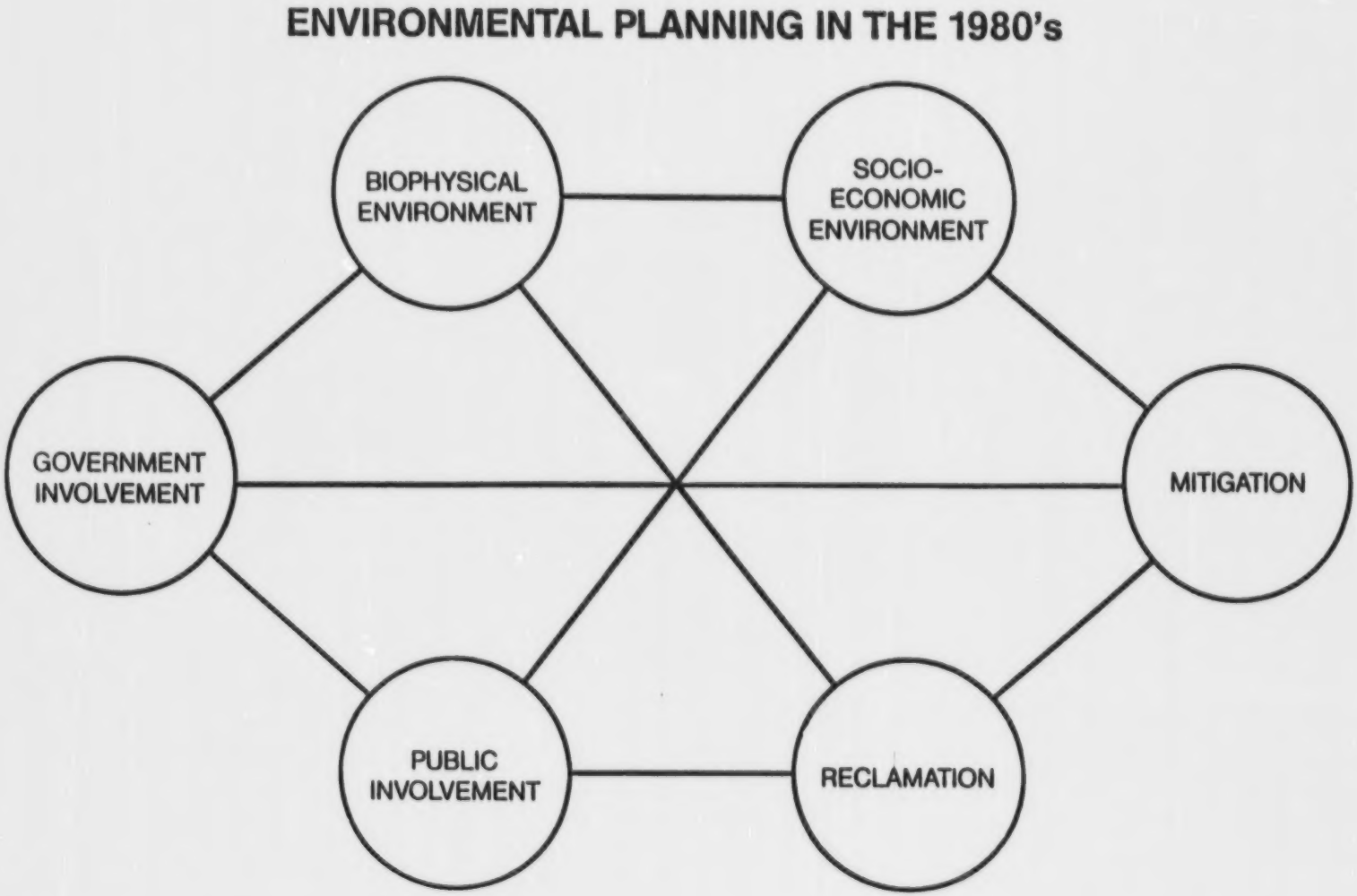

Figure 6: Environmental planning in the 1980's.

plots were incorporated. (Slide - Reclamation experiment, subsoil treatments). Finally, the area was landscaped and topsoiled. (Slide - Reclaimed Bulk Sample Site). (Slide -Telkwa Panorama, Sample Location).

We consider that this bulk sample programme is an excellent example of integrated development planning. Consideration of all aspects of such a bulk sample program allows an early assessment of the relative magnitude of potential environmental and reclamation problems, both technical and financial. Early identification of potential areas for specialized materials handling methods is one of the numerous advantages which accrues from the integration of geology, engineering and environment. When all disciplines are incorporated into the mine design and cost studies, an objective, balanced, assessment of the technical and financial viability of the project results. This is a real assessment, not a laboratory study, a paper study or a computer simulation.

Now I will open "Pandora's box".

Earlier, I asked you to note diagram C, the project as an experiment (Figure 2). I commenced this discussion with a definition of criticism, intending to critically address mitigation. Instead of reviewing mitigation, I have been led to critically examine the underlying premises of the E.I.A. process as it exists today.

Let us now consider the logical outcome of these deliberations. I will say that I think the growth of environmental movements from the 1960's was warranted and has been beneficial to society. However, the environmental impact assessment process which grew from those concerns as reflected in diagram C, is essentially a process which continues in parallel with the basic decision making process of project development and impinges on that decision making process at only one point, and that usually being long after the major design decisions have been made. The inclusion of environmental concerns, environmental information, into this decision making process over the last twenty years has been basically on an informal basis or, in some cases, not at all. Here's where I get to "Pandora's box". If environmental information,

environmental concerns, are assessed throughout the project development decision making process there is no need for the E.I.A. process as we presently know it.

Inclusion of the environmental information should be an iterative process which continues from the earliest exploration phases right through to mine operation. One of the major problems I have with diagram C is that following the baseline study there is possible hypotheses revision only. It implies that project perturbation necessarily occurs. There is no indication that the findings of the environmental impact assessment have any contribution to project design and nor do they result in modification of project design.

I had indicated that the environmental data gathering and analyses should identify effects whether they be actual or potential. With these being identified and accounted for early in the development process many may be designed out, in other words, the potential effects are avoided. No mitigation is necessary for those.

Beanlands and Duinker presented an elegant refinement of the present E.I.A. method in their text. However, they did not address use, which is critical; particularly use relevant to modern mine development.

To conclude, I have attempted to address not the technical aspects of mitigation, that is, which mitigative measures one uses but the need for the early and accurate identification of the potential negative environmental effects of development so that they may be either avoided or mitigated to reduce their severity. In effect, refine the concept on which the present E.I.A. system is based, that is, identification of probelems prior to project design decision. Dams will be built, trees logged and mines developed for the net benefit of society. Society's responsibility is to develop mechanisms to avoid or minimize the adverse effects.

What does the future hold?

While Dr. John Marsh, Chairman of the Environmental & Resource Studies program at Trent University notes, in Environment Views, January/February of

1984, that "the growing peace movement now resorts to civil disobedience, and even violence, and that may give the environmental movement a hint of things to come", I feel that the comment by Tom Beck, Chairman of the Canadian Environmental Advisory Council in the same Environment Views "when the environmental movement finally registered in a constructive sense on people in industry, they were quick to respond as they so often are", is more accurate and I think more indicitive of the future. I agree with Beck. Environmental concerns and the need to address them will be accepted corporately on economic and philosophic grounds when they are presented in a constructive manner.

Consequently, we need solution oriented methods, not process oriented methods.

THE LEGAL BASIS FOR ENVIRONMENTAL MITIGATION IN ALBERTA

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INTRODUCTION

The following definition, taken from the B.C. government's "Environmental and Social Impact Compensation/Mitigation Guidelines"[1], provides a useful starting point:

> Mitigation refers to measures taken in the planning, construction or operation of a project with the specific objective of avoiding or reducing adverse environmental or social impacts.

As the B.C. Guidelines point out, "mitigation" can take a number of forms.[2] A development project can involve the least cost design, without regard for environmental or social impact. It is probably safe to assume that we are now past that point in most, if not all, contemporary development decisions. Second, the design may involve measures that incorporate all federal and statutory requirements. As a rule, this can be considered a given, and the pertinent issue then becomes whether or not the existing requirements are sufficiently stringent, and whether they are enforced. Third, a design may go beyond statutory requirements and meet the accepted practices in the industry. In some cases, government (or, as we shall see, affected parties) may

require a degree of mitigation that goes beyond the statutory or even industry practice. Thus, mitigation may be "statutory", "accepted practice", or even "negotiated". The B.C. Guidelines also contain this definition:[3]

> Compensation refers to payments (in cash or in kind) which are made by the developer (or party responsible for the impacts) with the objective of redressing or offsetting the losses which occur despite or in lieu of mitigation efforts.

Both concepts (mitigation and compensation) should be kept in mind when approaching the subject from a legal perspective because, in some respects, the legal system may offer more on the "compensation" side than on the "mitigation" side; to the extent that this is the case, we must ask how mitigation can best be achieved outside the legal system, or what elements can be added to the legal system to improve its role in environmental mitigation.

In my paper, I will look at the role of the legal system in environmental mitigation from four aspects. First, to what extent can the common law, as applied by the civil courts, be utilized to achieve mitigation? To whom, in what circumstances and with what chance of effectiveness are civil remedies available? Second, what role can be played by the prosecutorial system, where criminal proceedings are launched for breach of a federal or provincial environmental standard? Third, what can the regulatory system in Alberta accomplish in relation to environmental mitigation? Finally, I will examine some new trends occurring both in Alberta and elsewhere, namely the adoption of negotiated mitigation and compensation measures by developers in relation to those affected by a particular project.

THE ROLE OF THE COMMON LAW

In the 1960's and early 1970's, much attention was focussed by legal scholars upon the extent to which the courts might be used as environmental watchdogs.[4] Overall, the prognosis in Canada was not very positive, and it was this conclusion, in part, that contributed to the establishment of various public review processes of the impact of development projects.

Very briefly, the common law offers certain remedies to certain people in relation to particular environmental damage. Remedies are available to

private landowners through the concept of private nuisance.[5] If a landowner can establish, on a balance of probabilities, that the ordinary use and enjoyment of his land is being unreasonably impaired by the activities of another, he can seek damages (compensation) as well an an injunction to restrain the offending party from proceeding with his activities.

The notion of public nuisance also provides remedies for damage to a public good, such as coastal waters. However, this right can only be pursued by a representative of the government, except in those cases where the private citizen can show he has suffered special damage different from the injury of the general public.[6]

The common law also offered remedies to a riparian owner, that is, one whose land bordered upon water. The riparian owner was entitled to receive the same quantity and quality of water flowing past his property as he had been used to.[7] If he could establish interference with these rights, the common law made available the possibility of damages and/or an injunction.

Environmental lawyers in Canada also asked to what extent non-landowners, that is members of the general public, might rely on the courts to restrain environmental degradation. The so-called "public trust doctrine" was examined as a possible mechanism. While legal opinions differ as to its potential,[8] it has yet to be successfully argued in a Canadian court.[9]

The causes of action available even to private landowners through the courts suffer certain deficiencies. For example, statutory authority may be a defense to an action in private nuisance.[10] In Alberta, it remains debateable to what extent the concept of riparian rights has survived the terms of the Water Resources Act.[11]

But assuming that such legal hurdles can be crossed, there are other reasons why the civil courts do not provide a particularly effective means of environmental mitigation. Here are just a few. Litigation is time-consuming, and often significant damage will have occurred before a decision is given by the courts. Although interim injunctions may be sought, courts are reluctant

to grant these except in the clearest of cases.[12] Litigation is also expensive, particularly in environmental cases where the issues tend to be scientifically complex, requiring reliance upon expert witnesses. Sometimes, the state of scientific information makes it difficult or impossible to establish that a particular activity leads to a detrimental effect. Judges, being lawyers, have to be educated about scientific terms, tests, and information in order to understand the parameters of the issues. Moreover, litigation requires the exercise of individual initiative, even though a broad group of people may ultimately benefit from a successful lawsuit. Finally, the nature of courts makes it exceedingly difficult for them to offer anything other than a one-shot remedy, such as damages or an injunction. They lack the expertise and the administrative mechanisms with which to monitor impacts, and thus their decisions are necessarily of an all or nothing nature.

A recent Nova Scotia case is a good example of the limited usefulness of the civil courts in environmental mitigation. In Palmer v. Stora Kopparbergs Bergslags Aktiebolag c.o.b. Nova Scotia Forest Industries,[13] fifteen landowners from different areas of Nova Scotia, both on behalf of themselves and others in their areas, sought to enjoin the defendant company from spraying herbicides in various afforested areas. In the late summer of 1982, the plaintiffs had been granted an interim injunction by the Nova Scotia courts; however, this was overturned by the Nova Scotia Court of Appeal on the ground that there would be no spraying until the summer of 1983, and the issue could be tried fully by that time. The judge before whom the trial then took place expressed some concern about hearing the injunction application when the defendants had not yet applied for a 1983 spraying license. As he pointed out, "the Court does not issue a useless injunction. Without a licence there is nothing to enjoin".[14] However, the parties agreed that, in the absence of a court ruling, the defendants intended to apply for a 1983 licence. Thus, the judge was able to conclude that it was in the interests of the parties and the general public to proceed.

This underlines another limitation upon use of the civil courts: an action will be entertained only if the timing is perfect. If an action is brought too early or too late, it can be dismissed on the ground that it is "premature", or because the issue is now "academic".

A preliminary objection was raised in the case concerning the representative nature of the action, with the defendants asserting that it was improper in these circumstances. The court's reasoning on this point is both helpful and interesting. In Nova Scotia, there is a court rule that permits representative actions where numerous people have the same interest in a proceeding. Clearly, there were "numerous people" in this case. The court was able to find that there was also a "common interest", namely health risk. The fact that the means of harm (direct spray, drift, water, and other human contact) and the probability of harm to each group varied was not considered a legal obstacle by the judge. Moreover, he was willing to overlook the fact that the representative action involved people from widely scattered areas. Although

> [I]t may have been more proper for the action of each group to have been brought separately and consolidated via consolidation of action procedure ... this is not fatal in this particular action. The issues are identical in each case, as is the alleged risk, the source of risk and the remedy sought. The same scientific evidences applies to each group ... . To hold otherwise would constitute an injustice to all involved, including the defendant who would immediately be put to the test again by the same plaintiffs, in separate actions, which would undoubtedly be consolidated and result in a trial identical to this one.[15]

This relative flexibility on the part of the court is encouraging, for it recognizes the high cost of litigation to both sides of a case. It acknowledges that complex environmental litigation is likely to take place only if a broad group of affected parties are able to band together. The defendant had also objected to the action on the ground that it really related to public nuisance, and thus could be pursued only by the Attorney General, or by parties who could show special damages. Although the court's reasoning on this point is less than crystal-clear, it was held that an allegation of serious health risk is always a matter of special damage. However, this was not really a case of public nuisance, as it related to a group of persons. "To hold otherwise would permit a reluctant Attorney General to deprive citizens of their right to seek the protection of the Court when faced with a serious health risk".[16]

In addition to the injunction the plaintiffs sought a declaration that they had "the right to be free of exposure to the phenoxy herbicides 2,4-D and

2,4,5-T". This the Court emphatically refused to grant, pointing out that it was not within its power to do so. Exposure could come from many different sources, while the court could only deal with the rights between these plaintiffs and this defendant. "What the plaintiffs are seeking here is a societal matter and therefore a matter for government or a regulatory agency".[17] Moreover, "[b]y far the greatest amount of phenoxy herbicides are used in agriculture and such a declaration would have widespread ramifications in that industry without anyone involved having been able to present evidence or argument to this Court".[18] These passages demonstrate clearly the court's view of the limitations on its own role, and the fact that it can only be employed to resolve issues pertaining to the parties before it.

Aside from these and other ancillary matters not of interest to the subject under discussion here, the issue in the case reduced itself to one question: Had the plaintiffs offered sufficient proof that there was a serious risk to health and that such serious risk would occur if the spraying were permitted to take place? On this point, the evidence before the court was massive. The trial had involved twenty-one days of evidence from forty-nine witnesses, most of whom were experts from not only North America but also abroad. There were one hundred and fifty exhibits, including seventeen volumes of reports to which hundreds of scientific articles were attached. As Mr. Justice Nunn pointed out, "[t]he whole trial took on the aura of a scientific inquiry as to whether the world should be exposed to dioxins".[19] However, he said, a court of law is not the appropriate forum for determining matters of science. Where science itself is uncertain, a court cannot resolve the conflict. Indeed, most countries have regulatory bodies to control the use of new chemical compounds. In the judge's view:[20]

> To some extent this case takes on the nature of an appeal from the decision of the regulatory agency and any such approach through the Courts ought to be discouraged in its infancy. Opponents to a particular chemical ought to direct their activities to the regulatory agencies or, indeed, to government itself where broad areas of social policy are involved. It is not for the Courts to become a regulatory agency of this type. It has neither the training nor the staff to perform this function.

After having reviewed the scientific evidence in considerable detail (the case report itself consisting of more than a hundred pages), the judge concluded

that the weight of current responsible scientific opinion did not support the plaintiffs' allegations of serious health injury from the herbicides. In general, he accepted the evidence of the defendant's experts over that of the plaintiffs'.

With the plaintiffs having failed to discharge their burden of proof, the matter of the costs of the action remained to be addressed. Costs and damages resulting from the interim injunction were estimated at $500,000, and these were awarded against the plaintiffs. In danger of losing their property, they launched a national fund-raising campaign, which raised only about $100,000. Following negotiations, the defendant company agreed not to pursue them for the balance of the costs, provided they would undertake not to appeal the trial court ruling. The loss of the case, as well as the award of costs, will undoubtedly prove to be a major deterrent to others considering use of the civil courts in the future.

THE ROLE OF THE PROSECUTORIAL SYSTEM

The 1960's and 1970's saw the development of a panoply of environmental statutes throughout Canada, designed to promote clean air and clean water, and to put into effect administrative mechanisms for monitoring these standards. As other papers in this session outline, environmental administrators in Alberta possess a number of enforcement tools, including the power to issue stop orders.[21] Typically, Canada's environmental statutes have relied upon the criminal law system as the ultimate enforcement mechanism. Thus, for example, it is an offence under s. 33 of the federal Fisheries Act[22] to deposit in waters a substance deleterious to fish. Similarly, it is an offence under s. 4 of Alberta's Clean Water Act to exceed the discharge limits contained in permits granted by the Environment Department.[23]

Opinions differ as to usefulness of the prosecutorial system. Some assert that it should be used more often and more effectively to assure that operators take their environmental responsibilities seriously. Others contend that it suffers too many shortcomings to contribute substantially to environmental protection.[24]

Whatever one's viewpoint, it is possible to outline a number of difficulties in using the criminal process in mitigation. The standard of proof in criminal cases (beyond a reasonable doubt) is much more difficult to meet than that in the sort of civil case discussed above (a balance of probabilities). In cases of scientific complexity, the problems discussed earlier (education of the judge, reliance upon expert witnesses, scientific uncertainty, etc.) increase exponentially, along with the cost and time factors. If a given case is sufficiently clear, the ultimate remedy is likely to be a fine which, even if substantial, may not provide a deterrent against future breaches, or may not come close to an appropriate level of compensation for the damage caused. Moreover, fines are paid into General Revenue, and thus only indirectly applied to mitigate the damage caused. Finally, criminal sanctions are only a one-shot solution, and, except as a possible deterrent, do not reduce the likelihood of future occurrences.

The difficulties inherent in the criminal system can be illustrated by the recent prosecutions of Suncor by the Alberta government. This series of charges all arise out of incidents that occurred in February and March of 1982 at Suncor's oil sands plant in northern Alberta. At the time of the incidents, all waste water systems at the Suncor plant ended on one large pond, which was designed to allow the streams of water to flow gradually to the river. The winter of 1981-82 was extremely severe, and the plant suffered from a series of fires which created operational difficulties. These led to discharges of certain substances into the Athabasca River. As a result, charges have been laid under the provincial Clean Water Act for releasing substances beyond the licenced limit and for failing to report such discharges, and under the federal Fisheries Act for depositing substances deleterious to fish, namely oil and grease and phenols.

Originally, five charges pursuant to The Clean Water Act were tried. Acquittals were entered in relation to four charges of exceeding licence limits, on the ground that Suncor had exercised due diligence in attempting to prevent the discharges. The company was convicted of failing to report the discharges.[25] Subsequently, five charges under the Fisheries Act were tried.[26] Four of these related to the same incidents tried under The Clean

Water Act, and acquittals were entered on the ground that the due diligence defense had been successfully established in the former trial. A conviction was entered on the fifth charge. It appears that the due diligence defense failed on the fifth charge because of the nature of the evidence put in by the Crown in the second trial; in the first case, the Crown failed to contest Suncor's evidence that it had taken all reasonable steps to avoid the spill.

The fines for the two convictions totalled $8,500, and both are under appeal.[27] Raised in the Fisheries Act conviction is the legal issue as to where the proper measuring point ought to be in establishing a deleterious substance - at the outflow point or in the river.

Fifteen other charges under the Fisheries Act have now been laid, all relating to the same set of incidents but arising on different days than the ones tried earlier. Proceedings in relation to two of these charges commenced on October 17, 1983, have now occupied approximately nine weeks of court time, and are expected to continue for an additional six weeks. The early stage of these proceedings saw preliminary applications by Suncor to have the cases dismissed on a number of grounds, including abuse of process (because the Crown was attempting to prosecute again for overall offences which it had previously failed to establish) and violation of the federal Charter of Rights (because there had been considerable delay in bringing the matters to trial). These preliminary motions were unsuccessful both before the provincial and Queen's Bench courts, and leave to appeal to the Court of Appeal was denied.

Some seven weeks have now passed in presentation of the Crown case. This has included elaborate tracing of the handling of both water samples and fish taken from the river, to establish the continuity of evidence which is essential in a criminal proceeding. Considerable evidence on tests relating to the deleteriousness of the deposited substances has been entered by experts from throughout North America, in part to educate the judge as to the applicable scientific standards. Testimony has also been taken as to the taste of fish caught in the Athabasca River, many hundreds of miles downstream from the plant. While the outcome of these proceedings remains to be seen, it can be observed that the Crown faces an enormous burden in establishing its case

"beyond a reasonable doubt". It can be argued that it is impossible to establish a cause and effect relationship between discharges at the Suncor plant and fish caught a considerable distance away. The "taste" tests on fish are not sophisticated or even very scientific in nature. Scientific controversy exists in relation to many of the points under scrutiny. The time and cost involved is substantial. And, even if the prosecutions succeed, the penalties are likely to be fines which, it can hardly be said, contribute to "environmental mitigation".

This is not to say that criminal proceedings have no role to play. As in the Suncor case, they can be helpful in defining the limits of the legal standards being applied to polluters. They can contribute to the improvement of scientific procedures, and provide an effective training ground for environmental scientists and managers. The threat of criminal proceedings may encourage the developer to take other mitigative measures. (While not necessarily an example of the operation of the latter principle, it should be pointed out that Suncor has now redesigned its waste system, dividing the large pond into three smaller ones that should prove easier to control.) Finally, criminal proceedings can also serve to increase public awareness of environmental matters, and to increase (or otherwise) public confidence in the existing environmental control systems.

That the government also perceives limitations in the prosecution system, however, is well illustrated by the recent controversy surrounding alleged deposits of silt and coal dust into the Lovett River by Luscar-Sterco.[28] While consideration was given to laying charges under the Fisheries Act, there was doubt about the likelihood of success, due to informational deficiencies and a lack of documentation as to adverse effects on fish from the deposits. Rather than a lengthy and costly trial, the government instead chose to make cleaning up the river a requirement of the grant of $3 million per year in royalty relief, over a three year period.

From a mitigation viewpoint, this may be the most rational approach. However, it does raise issues of even-handedness. For example, why should one polluter, and not another, be put to the time, expense, and adverse publicity

surrounding a pollution trial? Upon what basis should the discretion not to prosecute be exercised? Are there circumstances in which the discretion will be exercised for political or publicity reasons, rather than for sound environmental policy reasons? Until such decisions are made in a more open forum, suspicions are bound to persist.

THE ROLE OF THE REGULATORY SYSTEM

It can be seen from the previous two sections that the courts, both civil and criminal, exhibit major shortcomings in any quest for environmental mitigation. Much more important is the role of the regulatory system, namely the public review process before the Energy Resources Conservation Board for major projects, the conditions that can be attached to project approvals both by the ERCB and the Environment Department (and others, such as local government), the monitoring systems that exist to ensure compliance with such conditions, and the reclamation requirements imposed by provincial law. These matters will be dealt with in greater detail in the other papers in this session.

Elaborate mechanisms also exist in relation to interference with the rights of surface owners by those with rights to minerals. While it may be argued that there is still room for improvement in the system set up under Alberta's Surface Rights Act,[29] the legislation has been overhauled recently to deal with at least some of the deficiencies identified through a public review process.[30] Although the thrust of these legislative provisions is upon compensation to surface owners who suffer from environmental damage, the review mechanisms undoubtedly help to encourage mitigative measures by mineral owners.

RECENT TRENDS IN ENVIRONMENTAL MITIGATION AND COMPENSATION

Major developments occurred in the 1970's in relation to environmental review processes. The age of environmental impact assessment dawned, with developers being required to predict the social, environmental, and economic impacts of major projects, and to subject such assessments to public reviews which could lead to the imposition of mitigative measures. In Alberta, such

public reviews have occurred primarily before the ERCB, with greater public participation at least somewhat facilitated by the availability of funding for local intervenors.[31]

At least a decade of experience with these processes has led to some disenchantment on all fronts. Developers complain that hearings are too costly and time-consuming, increase uncertainty, and make time-line and economic planning difficult, if not impossible.[32] Public intervenors, on the other hand, are finding their resources stretched to the limit by the plethora of hearings in which they could become involved, not to mention the cost and time which necessarily attends participation in complex regulatory hearings.

Thus, attention is now turning toward means whereby contentious issues might be resolved outside the regulatory process, through direct negotiations between developers and affected parties.[33] While by no means intended to be comprehensive, the following examples demonstrate the operation of such approaches.

Dome Petroleum/LAX KW'ALAAMS Indian Band Council

The first example is the agreement recently entered into between Dome Petroleum Limited and the LAX KW'ALAAMS Indian Band Council in connection with Dome's LNG project on the northern B.C. coast.[34] The Dome project, presently under review by the National Energy Board, involves the construction of a liquefaction plant and storage and marine facilities for LNG near the Band's reserve lands, and requires easements for pipelines, powerlines, and roads across the reserve lands. The preamble to the agreement states that "the parties wish ... to address the mitigation of Project impacts, compensation for Project impacts that cannot be fully mitigated, the terms upon which Dome and others may secure easements ... across Reserve lands ...".

The Agreement deals with an enormous range of subjects, including compensation for impacts, employment and training, business opportunities, construction camp policy, and utilities and road corridor, to mention just a few. There are some of particular interest to this discussion. In section

10, Dome undertakes to "take all necessary measures to mitigate any impacts adverse to the Band that arise as a result of the construction and/or operation of the Project", and to compensate for impacts suffered prior to mitigation, or for adverse impacts that are not fully mitigated.

More specifically, Section 11 deals with fisheries and wildlife. Dome undertakes to schedule the routing and arrival of carriers in a manner that does not disrupt limited fisheries openings, and to take "reasonable and necessary" measures to protect the fish habitat and prevent the reduction of fish stocks. Mechanisms for collection of baseline data are to be put in place, along with impact monitoring systems. Compensation is to be provided for losses to the Band as a result of reduction in the commercial or food fish harvest. In proceedings to establish such compensation, the onus is on Dome to establish, on a balance of probabilities, that the cause of reduced stock or harvest is other than the project. This is an unusual provision, of course, as the onus of proof in other proceedings is typically upon the party suffering the loss.

There is a covenant in Section 11(9) in which Dome undertakes to take "all such measures as are reasonable and necessary to protect the Wildlife habitat and prevent the reduction of Wildlife stocks", but there are no provisions requiring research or specific mitigation measures in relation to wildlife. Presumably this reflects the Band's greater reliance upon fisheries, as well as the anticipated impact of the project on fisheries as opposed to wildlife.

Two other aspects of this Agreement merit comment: the dispute resolution provisions, and the relationship with the regulatory process.

Under Section 13(4)(a), a Liaison/Monitoring Committee is set up. While its major purpose relates to employment, training, and business opportunities, it can consider other matters referred to it by the parties. Section 7 of the Agreement deals generally with the settlement of disputes. If a matter is within the responsibility of the Committee (presumably either through specific terms of the Agreement ar as a result of a referral to it), a procedure is set

out for discussions to settle the dispute. Failing such settlement, an arbitration process is available. If a dispute is not within the responsibility of the Committee, Section 7(1)(b) provides for the appointment of a representative from each side to seek resolution. Time limits are delineated. Failing resolution, mediation and arbitration proceedings follow. Only if these methods fail can a dispute be submitted to the courts under Section 7(2).

Although the Agreement commenced upon execution, it will terminate if for some reason the Project is cancelled (including failure to obtain regulatory approvals).[35] Under Section 15, the Band agrees to support the Project, and to make its support known to parties and agencies having approval powers in relation to the Project. Under Section 16(2), the Parties agree to seek inclusion of the Agreement as a term in the Certificate of Public Convenience and Necessity or other authority granted to permit the project. This does not limit the Band's right to seek inclusion of other terms and conditions in regulatory approvals.[36]

The National Energy Board has responded cautiously to the request for inclusion of the Agreement in its terms and conditions. The Board has asked both parties to file legal opinions as to whether or not it has authority, under its enabling legislation, to incorporate such a broad-reaching Agreement in a Certificate of Public Convenience and Necessity.[37] While the point may not be entirely clear, at least one legal scholar has expressed the view that the Board's authority is sufficiently wide.[38] Although the parties themselves have agreed to restrict reliance upon the Board in enforcing the Agreement (should it be incorporated into a Certificate),[39] incorporation would nevertheless have the advantage of making the private arrangement part of the overall public approval process.

Agreements Between Alberta Developers and Affected Landowners

While the Dome Agreement is unique in a number of aspects, it appears to reflect a trend among developers of dealing directly with isolated groups that may suffer impacts from major projects. There are other recent examples of developer-native agreements designed, at least in part, to minimize adverse

social-economic impacts. Petro-Canada for instance, announced an agreement with the Kitimaat Indian Band in connection with its proposed Rim Gas Project, in April 1982.[40] Although not put into effect due to the cancellation of the proposal, that agreement provided for the Band's equity and management participation, along with training and employment opportunities for the Indian people. Another example is the joint drilling venture established by Esso Canada Resources Limited, the Dene Nation, and the Metis of the Mackenzie Valley in 1983, which will also provide training, employment and management opportunities for the natives affected by the Norman Wells pipeline project. Efforts were made in that agreement to extract environmental covenants from Esso more substantial than those presently contained in the law, but no such provisions were agreed to.[41]

In all these cases, the developers obviously saw advantages in dealing with the affected groups directly, and outside the regulatory process. Closer to home, there are two examples of similar initiatives in relation to thermal electric projects.

The first arises from Edmonton Power's Genesee Power Project. Early in ERCB's hearings, intervenors expressed concern about possible disruption of their domestic water supplies, as a result of the project's mine. Edmonton Power committed itself in these hearings to replace any lost water through the deepening of existing wells or the drilling of new wells.[42] A short time later, the Genesee project was approved by the Board.[43] When the Board subsequently considered future expansion of Genesee's generation, intervenors continued to complain about the security of water supply and Edmonton Power's method of dealing with water problems.[44] The company reiterated its earlier commitments to investigate complaints and take appropriate action, as well as its intention to undertake a well survey in the area. Reference was also made to its negotiations of these matters with the County of Leduc, in relation to its development permit.

The Board observed as follows:[45]

> The Board considers commitments made by Edmonton Power to be binding, and is concerned by allegations that commitments regarding water

> supply have not been met. The Board ... is prepared ... to intervene to ensure that all terms and conditions attached to its approval of the Genesee mine and power plant as well as the commitments made by the applicant are complied with.

The Leduc County development permit granted to Edmonton Power does contain, as Schedule I, the Company's "water policy". The policy does not limit other remedies of the landowners, but does outline methods by which alternative water supplies can be procured, and by which ultimate responsibility and liability for loss or damage may be determined. In it, Edmonton Power undertakes to carry out an inventory of water resources in the Genesee area, and to establish a water monitoring system.

Where there is a perceived loss of or damage to water supply, the landowner is to contact Edmonton Power which, within 24 hours, will send an inspector to check the well. If the problem is mechanical or electrical, the landowner is responsible. If the cause cannot be determined or agreed, an alternate water supply will be provided by the company, and the parties then have the option to submit to binding arbitration. If the arbitration is not in favor of the landowner, he becomes liable for "costs as defined herein". The policy establishes four zones according to their proximity to the minesite. Within these zones Edmonton Power accepts different degrees of responsibility for loss and replacement of water, and the landowners may have varying degrees of responsibility for costs in the event of an unfavourable arbitration.

A second Alberta example relates to Transalta's Highvale Mine, which forms a part of the Keephills Power project. Two groups became involved in 1981 hearings before the ERCB relating to an extension to the mine, the Rosewood Sundance Environmental Society (RSES), and the Wabamun Home Owners Association (WHOA). Concern was expressed by intervenors as to the impact of the mine upon the quality and quantity of surface and ground water flowing into the lake, as well as possible interruption of water supplies which local cottage owners drew from wells. The ERCB noted the applicant's commitment to supply potable water to residents whose sources were interrupted by mining, but expressed concern as to the paucity of information available concerning groundwater flow patterns.[46]

Meetings were held with area residents, and Transalta's Water Supply Replacement Guidelines were developed in consultation with them.[47] These guidelines are addressed to four different landowner situations: landowners with wells prior to August 1, 1982, present landowners without wells as of that date, future landowners without wells, and subdividable land without wells. Although each situation is treated somewhat differently, a procedure is established for notifying Transalta about the interruption of a water supply. Transalta undertakes to provide replacement water if mining is the cause of the problem. Transalta also agrees generally, to compensate for additional costs of well deepening and drilling that can be casually linked to its mining activities.

Neither of these water undertakings are a panacea to the impacts of the projects. Nevertheless, they are noteworthy examples of the establishment of direct lines of communication between the developer and affected residents. At the least, they appear to provide flexible mechanisms for resolving problems arising from the projects, mechanisms that may be preferable to those available to landowners through the courts.

CONCLUSIONS

The above review of the role of the legal system suggests that it can continue to have some influence on the achievement of environmental mitigation. Remedies provided by the common law have not proven very adaptable to the increasingly complex technical and scientific issues facing today's society. Similarly, the criminal law system, as the major means of enforcement, may be too "backward looking" to contribute much to mitigation.

Clearly, the role of the regulatory system will continue to be critical. However, there are now indications that it, too, may have to be adapted to meet growing concerns of delay, cost, and technical complexity. Recent trends in the achievement of agreements between developers and affected groups, or in the joint development of guidelines relating to mitigation and compensation, show the need to move beyond our current regulatory thinking. The law will continue to be important in defining the nature and extent of responsibilities thus undertaken, and in enforcing them.

Finally, in the future, the role of government and regulators may become one of encouraging direct discussions between developers and those affected by projects, and in creating a legal and regulatory environment in which the achievement and enforcement of such agreements will prove possible.

FOOTNOTES

1. "Environmental and Social Impact Compensation/Mitigation Guidelines", Province of British Columbia, Environment and Land Use Committee Secretariat, July, 1980, at 4.

2. Id., at 5, 6.

3. Id., at 4.

4. See, for example, McLaren, "The Common Law Nuisance Action and the Environmental Battle - Well-Tempered Swords or Broken Reeds" (1972), 10 Osgoode Hall L.J. 505; Elder, "Environmental Protection Through the Common Law" (1973), 12 Western Ontario. Rev. 107.

5. For a thorough discussion of this concept, see Mclaren, supra note 4.

6. In Hickey v. Electric Reduction Co. of Can. (1970), 21 D.L.R. (3d) 368 (Nfld.), one group of fishermen unsuccessfully sought compensation where an effluent discharged from an industrial plant killed fish and reduced their income. Although the defendant's action created a public nuisance, the damage suffered by these fishermen was not unique in relation to fishermen as a class.

7. McKie v. K.V.P.Co., [1948] 3 D.L.R. 201 (Ont.), aff'd. [1949] 1 D.L.R. 39 (C.A.), aff'd. [1949] S.C.R. 698.

8. See, for example, C. Hunt, "The Public Trust Doctrine in Canada" in Environmental Rights in Canada (1981, J. Swaigen, ed.).

9. In Green v. The Queen in Right of Ontario, [1973] 2 O.R. 396, the plaintiff failed to establish a case based on the doctrine.

10. This defence is discussed at 363 in Lucas and Franson, 1 Canadian Environmental Law.

11. Id., at 383.

12. See discussion infra concerning the Nova Scotia forest spraying case.

13. (1983) 22 C.C.L.T. 22.

14. Id., at 29.

15. Id., at 118

16. Id., at 117

17. Id., at 123

18. Id., at 124

19. Id., at 130

20. Id., at 133.

21. See, for example, s.14 of Clean Air Act, R.S.A. 1980, c.C-12.

22. R.S.C. 1970, c.F-14, as amended.

23. R.S.A. 1980, c.C-13, as amended.

24. The former position is put forward in Environmental Law Centre, Enforcement of Environmental Law in Alberta, August, 1983.

25. R. v. Suncor Inc., a decision of His Honour Judge M. Horrocks, October 20, 1982.

26. R. v. Suncor Inc., a decision of His Honour Judge M. Horrocks, May 31, 1983.

27. Discussion with K. MacFarlane of Suncor Inc., March, 1984.

28. Calgary Herald, March 20, 1984, pp.A9 and A17.

29. S.A. 1983, c.S-27.1.

30. These changes are reviewed in Roulston, "The Alberta Surface Rights Act, 1983" 6 Resources, October 1983 (Canadian Institute of Resources Law).

31. For a discussion of the Local Intervenors' Costs Regulations, see Bruni and Miller "Practice and Procedure Before the Energy Resources Conservation Board", (1982) 20 Alta. L. Rev. 79 at 102.

32. These perceptions are reviewed in Hunt and Lucas, Environmental Regulation, Its Impact on Major Oil and Gas Projects: Oil Sands and Arctic 1981, (Canadian Institute of Resources Law).

33. A good overview of recent trends in this direction is found in Andrew R. Thompson, "Contractual v. Regulatory Models for Major Resource Development Projects: The Case for Infrastructure Agreements", presented to the Sixth Energy Law Seminar of the International Bar Association, Houston, February 19-20, 1984.

34. Dated October 14, 1983.

35. Id., s.2.

36. Id., s.16(2).

37. Conversation with Francis Saville, Dome's counsel, February 9, 1984.

38. Thompson, supra, note 33.

39. Supra, note 34, s.16(4).

40. Petro-Canada Press Release, April 29, 1982.

41. Conversation with Deborah Neal, counsel to the Dene Nation, March 7, 1984.

42. ERCB-AE Report 79-AA, pp. 20-14 and 22-5, January, 1979.

43. ERCB Report 80-B, p. 5-4, May, 1980.

44. ERCB Report 82-C, p. 34, February, 1982.

45. Id., at 34 and 35.

46. ERCB Report 81-A, March, 1981, p. 24.

47. Letter from Garry J. Prokop, Projects Rep., Transalta Utilities Corporation, 1984-03-02.

THE GOVERNMENT FRAMEWORK FOR ENVIRONMENTAL MITIGATION IN ALBERTA: THE ROLE OF THE ENERGY RESOURCES CONSERVATION BOARD

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In most cases, the words development and change are synonymous. Whenever development takes place, some changes invariably occur to the landscape, to the lifestyle and to the environment of the area. This has been generally recognized and various procedures and legislation have been introduced in an attempt to provide for as much compatibility as possible between what presently exists in a given area and the effects or changes that the particular development will have upon that area. An example common to Alberta is in the area of land use planning and zoning that spacially groups similar activities to as great an extent as is practically possible.

With regard to energy development, the ERCB, within its areas of responsibility endeavours to ensure that it takes place in such a manner as to be as compatible as possible with existing land uses and interests. Unlike urban or other forms of industrial development that can to some extent be directed to occur in a predestined location or sequence, energy development generally must take place where the resource is located. This constraint and other aspects of energy development means that planning, in the same connotation as that used in the urban planning sense, is of less use in preventing or reducing the possible conflicts. By the nature of the development, the energy industry must look to mitigating its impacts to attain compatibility to the extent possible. As the population of the province increases and the area of intensive land uses increases, the energy industry must consider mitigative

measures more often and apply more innovation to try and attain the greatest degree of compatibility possible.

In our view there is a limit to the compatibility of two or more different land uses co-existing in a given area. At some point one reaches an interface of mitigation vs rehabilitation; a point at which a choice must be made between further mitigating the impact prior to the development and operational phase so the result of the impact is minimized, or to let a project proceed and once abandoned have the impacted area reclaimed or rehabilitated to a level equal to its predevelopment status or some other "satisfactory" status.

At the point of decision on the mitigation-rehabilitation interface, it is necessary to have as full and as clear an understanding of the types, magnitude, and reversibility of the potential impacts as is practical and available.

Questions then that are asked are: What options are there? Can an impact be made acceptable via simple action taken so the impact does not develop? Can an impacted area be rehabilitated once a project's life is complete? Can or should we accept an impact for a limited period of time and a promise to rehabilitate? What trade-offs are possible? What are the consequences to the parties involved? What is the cost to a proponent, the cost to local parties impacted, the cost to an area or region, the cost to the environment and the cost to the people of Alberta?

As we see it, it is within this framework (that is an examination of the options and consequences) that one must define the parameters within which the development can take place. The ERCB has an important role in this process but is not the only one. In Alberta, various government departments and agencies at the provincial and local level also have important roles, and of course the public.

MANDATE OF THE ERCB

The Energy Resources Conservation Board (ERCB) has had its legislative mandate and jurisdiction expanded considerably since 1938 when it was

established and known as the Petroleum and Natural Gas Conservation Board. Today, under authority of various acts and regulations, the ERCB is responsible for administering oil and natural gas development, oil sands extraction development, hydro and thermal electric power generation and transmission, and pipelines associated with the energy resource industry. More concisely, the ERCB administers the exploration for, processing of and transportation of energy in Alberta.

ERCB ENVIRONMENTAL MANDATE

The ERCB has long been responsible for regulating certain environmental aspects of energy development. As a greater consciousness for maintenance of environmental quality arose in Alberta in the late 1960's and with the formation of the Alberta Department of the Environment in 1971, the ERCB's role with respect to environmental matters in the energy industry had to have regard for the responsibilities of Alberta Environment.

With respect to oil and natural gas facilities, the ERCB is responsible for most on-site environmental matters during the life of the facility and to ensure that a facility or project operates within all environmental standards and objectives set by the ERCB and by Alberta Environment. For projects involving thermal or hydro electrical generation or oil sands development, the ERCB's role in environmental matters is not as extensive, and is dealt with to a greater extent by Alberta Environment.

As the operation of a given facility may directly affect the ambient conditions, the ERCB works closely and co-operatively with Alberta Environment, with Alberta Energy and Natural Resources and with other provincial and local government departments and agencies.

Where an operator wishes to develop an energy project, a significant part of this approval process is typically through the ERCB, and from the ERCB through Alberta Environment to all other government departments that may have an interest. A number of preliminary matters to this formal process may be handled directly between the operator and the appropriate government department. Naturally there are also matters strictly within the jurisdiction of various government departments.

APPROVAL PROCESSES

Applications for approval of energy developments when made to the Board may be dealt with in several ways, depending on the nature and scope of the project. The project may be:

a) routinely reviewed and granted,

b) granted after referral to various government departments,

c) dealt with at a public hearing and a decision made by the ERCB on the application based upon the evidence presented by the proponent of the project, interveners and other government departments.

Relatively small applications such as for the drilling of a well in a non-sensitive[1] area, development of a production battery, installation of a small pipeline gathering system in a non-sensitive area, etc. are generally dealt with routinely by the ERCB, but if concerns are expressed could well result in a public hearing. Once satisfied that the proposal meets all ERCB regulations, including the environmental aspects contained in relevant regulations and guidelines (meets the minimum environmental requirements), approvals or licences are granted.

Applications for larger projects are reviewed by the ERCB staff and may be referred through Alberta Environment to other appropriate government departments. The proposal may also be advertised to the public. Once the Board and government departments are satisfied and providing that no public objections are received, the application is approved. Comments arising from the inter-governmental review process may be incorporated as conditions on

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1 Non-sensitive area is a working definition used to denote an area without a particular issue that requires attention or resolution before a permit or license is issued. An area may be designated sensitive because of a high concentration of H_2S in the gas or oil, its proximity to urban areas or areas with a concentration of residences, proximity to surface bodies of water, proximity to sensitive habitat areas, areas where previous occupant concerns have been expressed, etc.

the approval or permits, above and beyond those generally required pursuant to regulations (the minimum requirements plus site-specific requirements).

Applications for these sensitive or larger projects that result in objections being raised by the public or that the Board itself has concerns about, become the matter for a public hearing before the ERCB. Arising from the evidence presented at the public hearing by the proponent, interveners or the Crown in Right of Alberta (other government departments), a decision will be made as to whether the project should proceed, and, if it is decided it should proceed, under what terms or conditions.

I'm sure you must now appreciate that a key feature of the ERCB's process is this public hearing. Any party (individual, group or corporate body) who have an interest in the matter may intervene and participate in the ERCB public hearing. The ERCB endeavours to ensure that all potentially affected parties become aware of the application. Notice is given in some appropriate manner (either by letter or advertised in a local newspaper) to parties who may have interests that could be affected by a project. That party has the opportunity to indicate in writing to the ERCB the interest and concerns, if any, she, he or it has in the project. A hearing is then convened and all the interested parties are allowed to present a submission of evidence in support of or against the proposal and any related concerns. Based on the information presented at the hearing, a decision is made.

Public hearings may be very large proceedings with dozens of participating parties or relatively small proceedings with only two parties involved. Regardless of size, the process is the same; a weighing of the technical merits of the proposal against its specific environmental merits, leading to a decision.

Most of the public hearings held by the ERCB are of the smaller variety. An excellent case in point is a wellsite hearing where a landowner and operator disagree as to the optimal location of a wellsite on a given quarter section of land, appear before the ERCB presenting their evidence. A decision results which determines the specific location of the wellsite in question.

In addition to hearings, the ERCB may initiate an inquiry. An inquiry is a similar process to a hearing except at issue is either a review of the appropriateness of a present policy or industry practice, a proposal for a new policy either area specific or for the entire province, or a review of some major incident to develop recommendations to prevent similar incidences from happening in the future. A recent example is the inquiry into the Amoco Lodgepole sour gas well blowout and industry precautions for drilling sour gas wells. These inquiries allow for a full assessment of the issue, including technical matters and socio-economic and environmental matters.

While decisions resulting from major hearings and inquiries may result in the ERCB modifying existing or developing new policies respecting its administration of the energy industry, issues and views expressed at the many smaller hearings probably have as great an impact in shaping the "routine" decisions of the ERCB and fine-tuning the day-to-day operating regime of industry. The size or scope of a hearing should never be the determining factor as to whether a person participates or intervenes. The issue being heard should be the determining factor.

REGULATION DURING THE OPERATIONAL PHASE

Once a facility has received all the necessary approvals, permits and licences from the ERCB, other provincial government departments and local governments, the ERCB continues to be actively involved.

The ERCB has a staff of some 100 persons located in seven area offices, and two sub-offices across the province. It is the role of these persons and the Calgary office staff to:

a) verify that the facility is built according to the approved proposal,

b) operates in accordance with all regulations, guidelines and licence conditions.

The inspection of all the various facilities, from the largest sour gas plant to the smallest metering station, is done to determine that the facility

is operating in a technically competent fashion. A review of environmental impacts is part and parcel of essentially every inspection of every facility. In addition to the environmental inspection done as part of these routine and regular inspections during the year, facilities with a major potential for environmental impacts, such as sour gas plants, are inspected once a year specifically on their environmental merits.

Where an environmental problem is evident, the operator is directed to take immediate corrective action. Where an environmental problem is suspected, the operator may be requested to provide an assessment of the potential problem. This may involve hiring consultants with specific expertise to determine if a problem exists, and if it does, its extent, action required to mitigate the effects or rehabilitate the damaged area, and any modifications to the facility to prevent reoccurrence. Based upon a review of this report by the ERCB and appropriate government departments, direction will be given to the operator to proceed with specific undertakings.

The ERCB, in addition to its technical expertise with regard to energy facilities, has developed a good level of environmental expertise. Environmental problems on-site or off-site are almost always directly associated with some technical or operational aspect of a facility. The meshing of these two pools of knowledge allows the ERCB to determine undertakings that are both technically practical and environmentally acceptable.

Industry has generally co-operated well with the ERCB in responding to environmental concerns. Rarely has the ERCB had to use its legislative powers to direct an operator to take action. In fact often the ERCB, other government departments and industry work together to find a solution to problems.

Orderly inspection of operating facilities by the ERCB and a cooperative dialogue between the ERCB, other government agencies and industry has resulted in an effective process for responding to environmental concerns that arise unexpectedly during the operational phase of the project.

KEY ASPECTS OF THE PROCESS

To conclude, I will comment on a few factors which impact on the Board's process. Within the process used by the ERCB to attain and maintain environmental compatibility from the energy industry in Alberta, there are a number of key aspects that would clearly assist in facilitating this process. I will mention a few I consider to be major ones.

Perception

The public and the industry must have sufficient background and the necessary understanding of an energy proposal to allow them to respond in an appropriate manner. The public often appears to have difficulty in envisioning the actual impacts that will occur should a specific project be developed. The "public" is occasionally either not sufficiently concerned to become involved in the public hearing process or over-reacts to the proposal clouding real issues with side issues that are given too much emphasis.

Industry appears to fail to appreciate the issues that concern the public and therefore often prepare their proposals to address the matters that they perceive to be important. In fact, the difficulties are frequently a result of the lack of effective and meaningful communication by the industry with the public and vice versa. In any event, a lack of trust develops between the parties arising from the assumptions that "industry" is insensitive and only concerned about profits and that the "public" is out to stop development at any cost. This difficulty in perceiving the effects of a development, coupled with attitude problems, taint understanding and stand in the way of identification of mitigative measures that are required for there to be an acceptable project. In our view, industry and the public need to work harder at this issue outside the Board's public hearing process to make the system more effective.

Involvement

Decisions by the ERCB must be made within the context of the information presented and concerns raised at the public hearing. It is only recently (in

the last 5 to 10 years) that the public has become involved in the Board's hearing process to any great extent. While the ERCB has taken steps to encourage increased participation by the public, there must be a recognition by the public that they must exercise their right and responsibility in appearing before the ERCB if and when they have a concern with an energy proposal. Industry has been reluctant to become involved in the hearing process unless their interests or operations are directly affected. Industry also has a right and responsibility to appear before the ERCB when they have a concern in a matter or proceeding but are not themselves directly involved. The better the airing of the issues, the better balancing of the issues is possible for the Board. Thus, if the ERCB does approve the project, more realistic and effective mitigative measures will result as part of the approval.

Issue Identification

Though some types of energy developments have existed in the province for more than a century, it is only recently that impacts arising from energy development have been addressed. Not only do substantial knowledge gaps exist in the understanding of these impacts, but what knowledge is available is not well communicated or presented by the scientific community to the public, nor quite often to industry or the regulatory agencies. It is the scientific community, as the experts, who are expected to develop a data base that identifies the issues and provides an understanding of these issues in a credible and rigorous scientific manner. Much responsibility is placed upon this group to ensure that the proper questions are asked and then answers found to these questions.

Perspective

It may be recognized that a certain project may result in a particular impact. That impact and the mitigative measures which may be necessary must be weighed against impacts and the mitigative measures that would arise if some alternative was used to achieve the same objective as the proposal. An impact in itself may not be thought to be acceptable, but given the likely impacts of the alternatives, the proposed project may be least objectionable.

"Not Here Syndrome"

Often the ERCB finds itself having to balance the benefits that it sees accrue with the impacts upon the interests of people directly or indirectly affected by a project. There is a recognition of the benefits that will accrue to society or an acceptance of the need for a particular project, but the persons who may be affected are not prepared to accept the impacts or intrusion. This phenomenon is known as the "Not in my Back Yard Syndrome" or the "Not Here Syndrome". Similarly industry must be prepared to recognize the impacts of their project and be willing to make substantial concessions in some cases to make their projects "acceptable". The public as well as industry must be prepared to live with certain impacts or inconveniences or costs, unless society changes substantially in terms of lifestyle. We firmly believe that the "not in my backyard" issue, while it will not go away, would be much less of an issue if industry worked harder at trying to know their prospective neighbours and then was actively sensitive to their concerns and vice versa.

DISCUSSION

DES CONNER, Conner Development Services, Victoria.

I'd be interested to know what are some of the characteristics of the proponents who, on the one hand, intend to involve the public more, on the other hand the characteristics of those who don't.

E. BRUSHETT

I think the noon hour speaker yesterday said, "That's a very interesting question. Are there any other questions?" Characteristics of companies that are participatory are just that. When they have a project in mind, it's pretty evident right from the beginning that they get out there and they find out who is living in the area. They have an objective in mind, and they find out what the people's concerns are, they don't make an interpretation of what the people's concerns are. It's a mediation process. I expect that there are people here that could comment on that better than I can. Those companies that, or groups that maybe fall in the other category tend to fall back on, in my view, the regulatory process. They apply for a license or a permit and feel that they have done everything that's necessary because they have complied with the government requirements, and that, in itself, is not enough today.

LINDA DUNCAN

Ed, what do you think about the idea of resolving this in a more preventive manner with a provincial plan where a higher level, including the local people, make a decision on what kind of developments should go in a particular area, rather than leaving mitigative issues to the local people. For example, in the Red Deer region, which has prime agricultural land, decisions on petrochemical plants are made on a site-by-site basis where we try to put the petrochemical plants on the least productive soils within a specific area. Don't you think it's a bit unfair to suggest that proper decisions on planning or locating of energy developments can really be made in the system

that we have, where we don't have an overall plan, so we decide on a more rational basis, with everybody's input, where those developments should occur in the first place.

E. BRUSHETT

Linda, I thought you were going to deliver questions to Connie, because lawyers just speak to lawyers, don't they? I think you've got a good point, and in areas of petrochemical plants, Linda, I expect that that can be done. But there are many forces that are in play that cause a plant to be located where it is and sometimes the Board itself doesn't have that much control over the location. But where you come to such things as petrochemical plants, I suppose there are options. When you are talking about sour gas processing plants and pipelines and wells, I don't think that option is necessarily open, so mitigation is something that you really have to deal with rigorously. But for those energy facilities that don't have to be located over the resource, if a way can be found to do it, I'd have to agree with you.

MARTHA KOSTUCH

What do you see as the government role for other government departments and agencies in the public hearing process and do you think there's need for that role or, how could performing that role be improved?

E. BRUSHETT

Martha, I think that the involvement of government in the Board's hearing processes is increasing. And we are seeing the Crown in the right of the province in Alberta intervening at Board hearings more and more. But that's a decision that the government has to make and you might want to ask the next speaker that question.

MIKE COOPER

Ed, when I commended Millard yesterday, I didn't mean for the commendation to spill over to government agencies and regulatory bodies. I think

the experience with Gulf in the Pincher Creek area demonstrates that while communities may be able to work with industry, that process is leaving government behind. We find that Alberta Environment seems to be doing it and the ERCB sort of washed their hands and sort of smiled that they are not being asked to protect the public interest. And I think it's a little bit unfair to expect landowners, even though they have access to resources, to be put in the position of protecting the public interest on things, especially like reclamation. And I'd like to ask why, when the Board gave approval to decommission the plant in Pincher Creek, they did not begin at that point to establish guidelines for reclamation so that the public could see that there was someone acting in the public interest.

E. BRUSHETT

Well Mike, when the Board agreed that the Gulf plant should be decommissioned, in fact, that's what did start, was the development of guidelines for reclamation. It always seems that when something new comes up, the response happens after the first incident. It may be in this case that is also what happened. But be assured that guidelines, in fact, are being developed and who's going to be responsible for that is also under some consideration. I think you'll find that reclamation requirements will be forthcoming and will be a lot more definitive than they have been.

M. COOPER

Are you saying developed in conjunction with the public or being developed in-house?

E. BRUSHETT

I think they're being developed in-house.

M. COOPER

Are you guys with the environmental section of the ERCB going to be involved with this?

E. BRUSHETT

Mike, I think again, Ken may with to comment on this, but my understanding really is this aspect is under the Reclamation Act which the Board is not responsible for. But I would stand corrected by Ken on that.

MARCEL PICHE

I'd like to ask you, Ed, for a comment. Going back to the ERCB hearing and even before that, usually a resource company has years to study and plan a project. When that's announced, and the possibility of a hearing is announced, the public does not have enough time to prepare interventions, whether they be for or against a project. I'd like to recommend to the Board that the public be kept better informed and also be given more time to prepare interventions and to be involved in those processes. I know that it's usually, I think about six weeks maximum that a person or group has to prepare an intervention, whereas, say oil companies have years to prepare. I'd like to recommend to the Board that the public be given more time.

E. BRUSHETT

Marcel, I agree that this is something of a problem and, in fact, I guess I tried to point that out in the latter part of my talk, and maybe not as well as I could've. But the one way that this matter can be better resolved, is if the company that is promising some kind of a development does a whole lot of front end work with the people who may be affected long before you get into the hearing process. And if people such as yourself get that kind of lead time, and are given an understanding of the project by the proponent, I think that would go a long ways in helping to resolve what we see as a problem.

M. PICHE

A case in point is a recent application by Bow Valley Industries to take over the old Gulf test plant in Cold Lake and we had to find out through the

newspapers that this was happening. And I don't think that's fair for that to happen. The local people in the area should be informed, no matter how small the project may be, and given the opportunity to give their feelings and concerns.

E. BRUSHETT

I have to agree with you on that, Marcel.

M. PICHE

In that case, then, the Board should take steps to remedy that.

E. BRUSHETT

Nicely put. I'm not familiar with that project, Marcel, and in specific instances, that's one that I have no familiarity with, so I just can't comment on it as well as I would like to.

NEIL SKINNER

I was interested in when you were discussing the more regulatory aspects of your responsibilities, and I was wondering if the environmental group in the ERCB undertakes cumulative impact work; are you looking at the long-term, far-reaching effects of all the small nickle and dime stuff? This especially is true, I think, in the context of the more routine applications, the smaller sour gas plants, the things that tend not to be in the public eye. Do you consider the problem of routine approvals in the context of the cumulative impact of the enormous number of wells and kilometres of access roads, etc. that Mr. Millard spoke of yesterday? I'd just like you to comment on this general area.

E. BRUSHETT

No, our group, at the present time, is not a group within the Board to which there is referral of applications except in special instances. That

type of referral would go to Alberta Environment. Alberta Environment is a referral agency for the Board, and certain types of applications that Alberta Environment wants to see go up to them before any final decision is made on the application. And the people in the reclamation area, standards and approvals area, and so on, all have their look at pipelines and wells, in some instances, not very often for wells, but plants, compressor stations.

THE GOVERNMENT FRAMEWORK FOR ENVIRONMENTAL MITIGATION IN ALBERTA: THE ROLE OF ALBERTA ENVIRONMENT

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INTRODUCTION

Alberta Environment is keenly aware of the major role it plays in the Alberta Government framework for environmental mitigation. The government agency responsible for achieving environmental protection through implementing sound environmental mitigation practices is Alberta Environment. The efforts of Alberta Environment have resulted in the environmental mitigation of problems that, if left unchecked, would have seen a significant decline in the environmental quality of Albertans.

This paper will highlight some of the evidence that illustrates that solutions are being found to environmental problems, that environmental mitigation is occurring in Alberta, and that Alberta Environment has been responsible for putting into place environmental protection measures. Alberta Environment's role in preventing environmental problems through a variety of actions linked to environmental planning, is outlined, followed by a brief discussion of Alberta Environment's role in mitigating environmental problems through its regulatory system of approvals, monitoring and enforcement. The concluding section returns to the role of Alberta Environment within the government framework and its relationship to others.

Before addressing the role of Alberta Environment within the governmental framework, the concept of environmental mitigation within Alberta requires some elaboration.

ACHIEVING ENVIRONMENTAL QUALITY THROUGH MITIGATION

There is no shortage of definitions of what constitutes environmental mitigation. Most would define environmental mitigation in terms of the actions and measures undertaken to maintain or enhance environmental quality, or minimize adverse effects. Usually, the focus is upon the means undertaken to achieve environmental protection, and often the means tend to overshadow the desired result. But to most Albertans, it is the resulting environmental quality which is important and the mitigative measures used to achieve environmental quality are incidental. Mitigative measures in and of themselves only become of interest to Albertans when there is an apparent difficulty in achieving the desired result or quality of environment. The quality of the environment provides the context for the examination of the government framework for environmental mitigation in Alberta.

ALBERTA'S ENVIRONMENTAL QUALITY STANDARDS

Alberta Environment's responsibilities are to achieve a balance between resource management, environmental protection, and the quality of life. The yardsticks to measure the effectiveness of Alberta Environment in discharging its environmental protection responsibilities are those which measure the quality of Alberta's environment.

In a 1982 comparative study of Environmental Standards prepared for the Environment Council of Alberta, Franson, Franson & Lucas made a number of observations about Alberta's environmental standards. For example, in discussing ambient air quality they noted that Alberta

> "has adopted the Canadian Federal "desirable" level for particulates, carbon monoxide, oxides of nitrogen (annual average), and sulphur dixoide, and the Canadian Federal acceptable level for oxides of nitrogen (24- and 1-hour) and oxidants (ozone). The province is therefore well within the generally accepted practice of Canadian standards-setting bodies" (p.3).

Similarly, they noted that

> "on the whole, Alberta's standards for ambient water are quite similar to those of other jurisdictions" (p. 3).

Alberta's ambient air and water quality standards are of comparable stringency to those of other jurisdictions. Alberta has adopted generally accepted definitions of standards of environmental quality. These standards of environmental quality provide the basis for examining the role played by Alberta Environment.

WATER QUALITY COMPLIANCE

The Pollution Control Division of Alberta Environment routinely samples the quality of Alberta's major rivers. Surface water quality objectives represent water quality levels suitable for most users, whether through direct use, or prepared for use by an economically practical degree of treatment. The objectives apply to surface waters except in areas of close proximity to outfalls.

In the fall and winter of 1982 - 1983, the data available for sixteen stations on major rivers, sampled on a monthly basis, indicated that for the 3341 parameters analyzed, 99% met surface water objectives. This suggests that the overall water quality in Alberta is good. None of the toxic chemicals exceeded objectives or showed any increase in concentration downstream of the major centres. None of the herbicides or pesticides exceeded objectives. Those parameters that exceeded surface water quality objectives were those associated with organic loading; that is, nutrients and bacteria. In the large rivers downstream of major centres this was most probably due to municipal sewage effluent. In other rivers such as the Battle and Beaver, this could have been in part a result of naturally high organic loadings and low winter flows, which in those rivers resulted in oxygen not meeting the objective. The absence of biological activity at this time of year also probably contributed to high concentrations in the water column.

In the three spring months of 1983, of the 3479 parameters analyzed, again more than 98% met surface water objectives. Most of the exeedences of the surface water quality objectives were associated with spring runoff and high particulate loadings of materials. The other contributory factor, particularly at those sites downstream of major centres, is municipal sewage

effluents which mainly elevate nutrient levels (phosphorus, nitrogen) and coliform counts.

AIR QUALITY COMPLIANCE

The Pollution Control Division of Alberta Environment also routinely monitors air quality in both Edmonton and Calgary. In the monitoring results for both cities, the Air Quality Control Branch has noted that there have been minor fluctuations in annual concentration means in Calgary and Edmonton for individual parameters such as nitrogen dioxide, ozone, carbon monoxide, total hydrocarbons, total sulphation, suspended particulate matter, and total dust fall. However, during the period from 1975 to 1982, the air quality in both Edmonton and Calgary has remained relatively constant.

A major contributor to pollution in the cities are automobiles and recent tests (1982) show that a dramatic change has occurred since 1978 in the percentage of vehicles that are meeting exhaust testing standards. For example, in 1978 only 44% of the new vehicles checked could meet the standard, while in 1982, 86% of the new vehicles met the standard, an increase of 42%. In Calgary, about 80% of the air pollution loading comes from vehicles, and about 40% in Edmonton.

In examining the total hours of industry reported ambient levels in excess of the Clean Air (maximum levels) Regulations from January 1, 1983 to December 31, 1983, the following compliance record was obtained:

	Industry	Percentage
1.	Sour Gas	99.81%
2.	Oil Sands	96.34%
3.	Power Plants	100.00%
4.	Fertilizer	99.88%
5.	Pulp and Paper	96.82%
6.	Refineries	99.99%
7.	Chemical Plants	98.86%
8.	Heavy Oil Plants	99.93%

After reviewing the ambient air and water quality data available, it is apparent that the degree of compliance realized in Alberta is very high; in the 98 - 99% range for water quality and in the 96 - 99% range for air quality.

Earlier it was pointed out that the quality of the environment (the desired and result) provides the context for the examination of the governmental framework for environmental mitigation in Alberta, and the role played by Alberta Environment. The yardsticks to measure the effectiveness of Alberta Environment in discharging its environmental protection responsibilities are those which measure the quality of Alberta's environment. Alberta's ambient air and water quality standards are of comparable stringency to those in other jurisdictions. The degree of compliance to those standards in Alberta is very high, in the 96% to 99% range. To most Albertans it is the resulting environmental quality which is important, and by generally accepted standards the quality found in Alberta is high. Solutions obviously are being found to environmental problems in Alberta, and environmental mitigation is occurring in Alberta.

The next two sections in this paper will examine the role Alberta Environment plays in bringing about the mitigative measures that are ensuring that the environmental quality of Albertans remains high. Alberta Environment's role in preventing environmental problems from occurring through a variety of actions linked to environmental planning will be outlined first, followed by Alberta Environment's role in directly mitigating environmental problems through its regulatory system of approvals, monitoring and enforcement.

RECOGNIZING MITIGATIVE LIMITS

Alberta Environment plays a major role in defining the limitations of mitigative strategies to environmental problems. Basic environmental planning decisions about the type and location of development set the framework within which environmental mitigation solutions are found. In other words, once a type of development in a particular location has been accepted, the basic boundaries for mitigative solutions have been set. Perhaps the most crucial

decisions made by Alberta Environment occur at this level, and prior to the regulatory system associated with regulations, licences and approvals becoming activated. Alberta Environment plays a key role in the siting decisions associated with major new resource development proposals, usually in association with other departments, at what is known as the preliminary disclosure stage. Alberta Environment is also an active participant in the land use planning activities of the Regional Planning Commissions and their member municipalities, providing advice regarding the suitability of various forms of development in environmentally sensitive areas.

The Alberta Environmental Impact Assessment process also provides a means of considering the environmental implications of alternatives for siting and routing of facilities and functions as a bridge between decisions in principle about the environmental acceptability of a particular development proposal and the development of mitigative solutions. Implicit in defining the limitations to mitigative strategies is the strong endorsement by Alberta Environment of the preventive approach to environmental management. Essential to this approach is understanding the limits of mitigative strategies and recognizing that in some circumstances avoiding the need for mitigation represents the best solution to an environmental problem.

ENVIRONMENTAL MANAGEMENT THROUGH MITIGATION

Environmental management through mitigation is the underlying feature of Alberta's regulatory system. The system involves the establishment of standards, issuance of licences and approvals, monitoring, and enforcement. Standards are set recognizing a number of criteria such as environmental risks and the assimilative capacity of natural systems. Alberta does not provide detailed prescription on the means of achieving the standards, leaving the opportunity for innovation and creativity in meeting the standards. Licences, permits and approvals contain conditions of performance that must be achieved by operators, including detailed reporting requirements regarding compliance. Where warranted, a variety of enforcement options are utilized, including directives, orders, and prosectuion. The entire thrust of the regulatory system is to minimize adverse environmental consequences of development.

EVALUATING MITIGATIVE STRATEGIES

Basic to Alberta Environment's approach is the concept of negotiating compliance. Negotiating compliance tends to be low profile and quiet. The fact that it does not attract a great deal of attention may leave the false impression that it is not effective.

Alberta Environment's two pronged approach to environmental protection, through avoiding and preventing environmental impacts which are not mitigable and managing those which are, is working.

Compliance to stringent standards of environmental quality is high and being consistently achieved 96 to 99% of the time. With the high level of success being achieved by a regulatory system that relies upon quiet negotiation of compliance, careful consideration must be given to changes in the current system to ensure that the changes will improve upon, and not detract from, the high levels of compliance being achieved today.

Having regard for the fact that the prosecutorial system involves substantial time and cost, and even when successful results in fines, the question that remains to be answered is what contribution does a prosecution make toward achieving a higher level of environmental quality. At best, contribution is indirect and circuitous. At worst, it may make the offender recalcitrant and uncooperative.

While prosecutions tend to be high profile and noisy, they may also leave a false impression that they are effective in achieving environmental quality.

IMPROVING COMPLIANCE

Having put forward the point of view that Alberta Environment's approach to environmental mitigation is working, it would also be misleading to leave the impression that Alberta Environment is not concerned about the small percentage of the time that compliance is not achieved.

For example, Alberta Environment is serious about improving the compliance record of the municipalities throughout the Province. Municipalities

are the major contributors to the organic loadings in Alberta's rivers that cause Alberta's surface water quality objectives to be exceeded about 1 or 2% of the time. Since 1979, approximately a half a billion dollars have been allocated by the government to assist communities with regard to upgrading water supplies and sewage treatment. Included in that major financial commitment are:

1. $300 million in the municipal water supply and sewage grant program,
2. approximately $100 million in a regional water and sewage treatment program,
3. approximately $12 million in the northern supplementary fund,
4. $13 million in the phosphorous removal grant for the City of Calgary, and
5. the major debt reduction program in 1979 wiped out a debt of approximately $40 million associated with municipal water supply and sewage treatment programs.

Regarding air quality, the sulphur dioxide emissions of sour gas and oil sands plants are of concern to Alberta Environment. The Alberta Oil Sands Environmental Research Program in its 1980 Summary Report stated that research

> "has not yet demonstrated that damage has occurred from atmospheric pollutants ... (and) experimental evidence indicates that ground level concentrations of SO_2 would have to be considerably higher than at present to result in a significant response" (p. ix).

Yet since 1980, both Syncrude and Suncor have initiated expansion plans that include significant mitigative measures to control SO_2 emissions from Alberta's two oil sands complexes. Similar developments are occurring at some of Alberta's older sour gas plants that have had poor compliance records. For example, negative contributors to industry compliance records have been the old gas plants west of Calgary which are now being upgraded or replaced.

RESPONSIBILITIES OF OTHERS

Alberta Environment is the major player in achieving environmental mitigation in Alberta and is aware of the key role it plays in the government

framework for environmental mitigation in Alberta. Fundamental to that role is the recognition of the roles and responsibilities of various actors within the environmental protection and resource management policy field such as:

1. other government departments and agencies,
2. other governments at various levels,
3. private sector resource developments, and
4. the general public, public interest groups, and individual citizens.

Presentations by others at this Symposium on Environmental Mitigation will have highlighted particular aspects of the various roles played by these other actors in the development and implementation of solutions to environmental problems, and some will have made specific reference to their relationship to Alberta Environment. Recognizing the roles played by these other actors underscores the fact that achieving environmental mitigation practices is a responsibility that is not borne by Alberta Environment alone. For example, the role of the Energy Resources Conservation Board in environmental mitigation has been dealt with in greater detail in another paper in this session. Other sessions in the Symposium have focused upon the role played by industry, particularly in coal mining and sour gas development, and the role of the public.

CONCLUSION

The role played by Alberta Environment in the government framework for environmental mitigation in Alberta is to put into place those mitigative measures which achieve the standards of environmental quality adopted by Alberta. Alberta's ambient air and water quality standards are of comparable stringency to those in other jurisdictions, and in several cases, such as SO_2, are higher than those of others. The high degree of compliance currently being achieved in Alberta, in the 96% to 99% range, means that the resulting environmental quality found in Alberta is high. Solutions are being found by Alberta Environment to Alberta's environmental problems, and mitigative measures have been put into place that are achieving generally accepted standards of environmental quality. The regulatory system currently in place,

which relies upon quiet negotiation of compliance, is delivering a high standard of environmental quality. While the system is not perfect, suggestions for change in the regulatory system must be carefully examined to ensure that changes will improve upon, and not detract from, the high levels of compliance being achieved today.

DISCUSSION

LEE LEWIS, PETRO CANADA

I am not known for being quiet or withdrawn but I have managed to remain quite mute through this so I have three short questions. Ken, do you feel comfortable with a contrast system where the proponent and the individual would enter into what appears to be a monitoring requirement, terms and conditions, that are affected during gaining access, gaining the right to use the land by these two private individuals? It seems to me that it can be done definitely and our land people do enter into special terms and conditions. But doesn't it seem like it's because the individuals don't trust the government to carry through. My concern is that it wouldn't be even-handed in the fact that you have a number of landowners, some of them are very sophisticated, some may not be and they wouldn't know to make the types of agreements and it just generally leaves me with an uneasy feeling to have this kind of private agreement.

KEN SMITH

You touched on a basic core principle that is involved in the Land Surface Conservation and Reclamation Act and prior to that Act being put into place, the arrangement that existed was between the landowner and the resource developer and most of the landowners pocketed some money and left the land unreclaimed. Today, in our current situation, many of our farmers don't take that approach. In fact they would like to see a higher standard perhaps than what the province is ensuring, being included in their lease arrangements. The key point is that as long as those standards are higher than those that the province is demanding, then probably we as a society don't have much problem with it but if it involves a standard that is lower, then you would have the prospect of people basically paying damages and leaving land unreclaimed and I think that would go contrary to the public interest. That is a specific example in the reclamation context. There may be others but generally I think my view is that much of the negotiated process that goes on between individuals and resource developers relies very very heavily on that regulatory

framework that I was just talking about. Without it being in place, I really wonder how many satisfactory agreements would be reached between landowners and individuals and the resource developers.

LEE LEWIS

Through about 14 years of doing environmental assessments, I have come to the conclusion that it is very difficult to clearly and concisely present specific concerns with specific conclusions and problem solving and it is much easier to write a rambling inventory with a lot of motherhood. How good are our groups, the proponent, at getting away from this covering, a snow job, of gathering information and throwing it in five volumes on your desk and then saying gosh will it be good.

KEN SMITH

You sound like you're about as tired of that as I am.

LEE LEWIS

Yes, probably.

KEN SMITH

The reality is that we are seeing fewer and fewer of those sorts of documents in the regulatory system. Most proponents realize that you don't need a thick document to have an effective one. In fact probably the shorter and more precise it is, the better off everyone will be through the regulatory system. There is a few that still think that pounds make good sense in this business but the depth of the document really isn't the point. All of the government reveiwers know that. Most of the citizens that are involved with resource developments also know that. They are not impressed with a voluminous document that doesn't deal with their real concerns.

LEE LEWIS

One final point that I have, that I still think the system is too heavily front loaded. Assessment looking at what may occur is a very important part but it is only one in several very important steps and I still feel we are not getting out after we have identified problems in following through and looking at them and getting hard information back that we can draw conclusions on, that we have something to base similar decisions on rapidly and confidently. I would suggest I've gone through a lot of hearings, and a lot of inquiries and it seems like we're still getting the same questions, we beg the issue that we should start answering those questions with monitoring and surveillance that gives some hard data.

KEN SMITH

That's why I thought it was important to bring forward this morning, the degree of compliance that has been achieved in Alberta. We do have a heavily oriented front end system, if you like, which involves the Board hearings, EIA processes, all the regulatory paraphernalia that you see at the front end. It doesn't matter if we're not getting compliance out there and we are not achieving our quality objectives that we've set. What I am saying to you is that, in most of the cases, our average at bat is pretty darn good and we are achieving what we want to achieve. So the suspicion might be there that the follow through is not so great but what I'm saying is it is pretty damn good.

BRUCE SWITZER, ENVIRONMENT CANADA

You mention that Alberta Environment is not an environmental advocate. My question is, who in the Alberta Government is an environmental advocate? Which department or agency is?

KEN SMITH

There is no government department which is. The closest you will find to it I think are probably the Public Advisory Committees of the ECA.

MURIEL ABDURAHAM, CHAIRMAN OF THE HEALTH UNIT ASSOCIATION AND MAYOR OF THE TOWN OF FORT SASKATCHEWAN

I'd like to give you a bouquet before I ask my question and say that we certainly have seen, in the Town of Fort Saskatchewan, where directives have been very successful, where we have had co-operation between industry and Department of Environment. But my criticism that is going to be levelled at your Department is with regards to municipal sewage. We've been hearing the wonderful things that the provincial government grant program is doing in the Province of Alberta at the present time. But I have to ask the question, how are you going to resolve the dilemma that the Edmonton region faces at the present time with the capital costs, and there is a number of figures being bandied about from $140 million to $200 million. Where the Department of Environment went out, built a cadillac system when municipalities would assume their own responsibility and improve their lagoons or gone to activated sludge. We weren't allowed to. Department of Environment went out and built this cadillac system that probably will cost us $200 million and we don't know who is going to pay the bills. Do you have a solution yet?

KEN SMITH

Muriel, the solution, I think, ultimately will rest with our Ministers in cabinet and my understanding is that the problem has been brought to their attention. It's not a small problem, I think you well know. The important point that I wanted to pick up on there, though, is the high cost of looking after our sewage. And our municipalities are facing tax burdens the same as the province is in terms of revenues and what all of our costs of services are. And to have a clean environment and to have our rivers clean we have to be able to put forward the funds to have the systems in place to deliver that quality of environment and it comes down to what price are we prepared to pay. And interestingly enough, in the case of municipalities, that price comes out pretty directly in terms of your taxes or water charges and that's where the cheese starts to bind.

RON CHALMERS, EDMONTON JOURNAL

Mr. Smith, you said from the data that is available our air and water quality are pretty good and perhaps that is true. Unfortunately the data tends not to be available. Last fall, as you recall, the Edmonton Journal carried a series of stories about the North Saskatchewan River and immediately following that your Minister released some data on North Saskatchewan River quality which did indeed add to that picture and presented another side of it. In that context, it was indicated that such data would be made available on a regular basis. I've been trying continuously since that time to receive follow up data as collected by your department and I haven't been able to come up with a single piece of data. On a recent trip over to your department, I also inquired about air quality data and I found that the most recent quarterly reports for the Cities of Edmonton and Calgary were available only for 1982. My question to you is, will these data, which you have summarized for us today, now be made available or will they only be summarized from time to time when it is politically opportune?

KEN SMITH

As you know there's a Bill that went before the house in the last session that dealt with the availability of various types of monitoring data, particularly monitoring data from industry. And that Bill received royal assent and requires a Ministerial Order to put it into place, a system for making available various monitoring data that's acquired by the Province from various industrial sources in association with their compliance to our licenses and permits. You know also, I assume, that that Ministerial Order was circulated to a wide variety of interest groups and industry for comment. Those comments have been received and compiled and at this point in time the results of that are before the Minister for his consideration in developing a Ministerial Order to deal with the entire question of information availability regarding environmental monitoring data.

MIKE COOPER

First a comment. It seems in light of the fact that we don't have an environmental advocate in Government in the province and that we are basically

playing a passive role, it would seem to make as much sense to take credit for the discovery of the AIDS virus as it would for some of the good quality environmental criteria you were talking about earlier. My question has to do with the EIA process. First, can we assume that since Department of Environment has not adopted the new guidelines that were proposed in 1980, that the Government has decided that the old process is sufficient, and that we can expect Department of Environment to be contacting environmental groups in the next few years to develop a new environmental assessment?

KEN SMITH

The answer is no, Mike.

MIKE COOPER

No what?

KEN SMITH

Just no. You can't assume that.

MIKE COOPER

Are you going to be presenting new environmental impact assessment guidelines then?

KEN SMITH

In due course.

MIKE COOPER

You are as helpful as your Minister is. A specific question on the Oldman River situation. Your Department, as proponent of a dam on the Oldman River, has narrowed down the selection to two sites. That occurred several

years ago. Have you done any environmental impact assessment processes or studies on the site that is off the Peigan Reserve and will that be done before a decision is made on a site location?

KEN SMITH

Mike, you live in Three Rivers, don't you?

MIKE COOPER

Are you going to answer the question or not?

KEN SMITH

The answer is that the environmental overviews that were done in association with the Oldman River studies back in 1977 through 1978 looked at a variety of options for managing water in the Oldman basin. Prior to that specific investigations of a preliminary nature were done of the Three Rivers site including some environmental information. The answer is that no EIA has been done on the Three Rivers or Brocket sites at this point in time.

MIKE COOPER

In view of the fact that both of those sites have been identified, even with the preliminary information that is available, as having the most adverse environmental consequences along the whole stretch of the river, how can you say that the passive approach that the government is taking is protecting our environment?

KEN SMITH

One of the key points that you are raising, Mike, is what's the responsibility of Alberta Environment. I mentioned earlier it's to achieve the balance between resource management, and in the case of water, that means water resource management, environmental protection and the quality of life. In the

case of the Oldman basin and the water benefits that derive from that basin, there are a number of factors that have to be taken into account in terms of managing the water for the benefit of the people of the province. One of the factors that will have to be reckoned with is the environmental consequences of building on stream storage on the Oldman. The government, in its decision following the ECA public hearings and the extensive public consultation process that occurred in southern Alberta in the late 1970's, reached a decision that it would be in the public interest to have on stream storage in the Oldman. That decision has been reached by the government. The question of location remains to be determined and is still under review.

MITIGATING MAJOR PROJECTS IN NATIONAL PARKS

DR. BRUCE F. LEESON

Special Advisor, Natural History Research Division
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Parks Canada subjects all resource disturbing projects to the Federal Environmental Assessment and Review Process (EARP). While most of the projects are comparatively small and do not go beyond the preliminary review, or screening level, some are major. These larger projects are examined in far more detail with the preparation of either an Initial Environmental Evaluation with scoping, or an Environmental Impact Statement with a full public participation program. Major projects which are currently active include Trans Canada Highway (TCH) twinning in Banff, CPR mainline improvements with major tunnelling in Glacier National Park, ski area expansion in Banff and Jasper, river flow regulation in Rocky Mountain House National Historic Park and Banff townsite peripheral land use assessment in Banff.

Wildlife protection is a major issue in the TCH project, for without mitigation, the previously unacceptable vehicle/ungulate collision rate was predicted to worsen. An unprecedented Canadian effort utilizing fences, underpasses and wildlife trail construction is being implemented.

Railway improvements on the exceptionally steep landscapes of Glacier National Park necessitate large scale terrain impact. Slope stability, reclamation and visual aesthetics are highlight concerns for this project. Short term impacts include controlling the influences of work camps for 1200 employees, water pollution, bear/garbage conflict and sedimentation.

Ski area development problems normally involve visual concerns and terrain impact from run preparation. Sewage treatment is also problematic. Two new ski area issues are the summer use of the Sunshine Ski Area with concern for the impact on the alpine meadows, and the installation of snowmaking on unstable slopes at Lake Louise.

Hydro power generation on the North Saskatchewan River outside of Rocky Mountain House National Historic Park jeopardizes valuable cultural and natural resource features inside the park. The opportunities to guard against ice pack damage are limited, expensive, or threatening to the park's integrity.

Banff townsite issues relate largely to conflict with limited ungulate winter range, biologically diverse and productive wetlands, preservation of open space, and the need to accommodate wildlife migration through this increasing constricted part of the Bow River Valley.

Dr. Leeson's presentation was based on a slide show demonstrating aspects of the above mentioned subjects.

DISCUSSION

UNIDENTIFIED

Up till a few years ago, (inaudible).

B. LEESON

Jasper has a new treatment system, a brand-new treatment system, that is based on (inaudible) system. Banff is being upgraded; it's not done yet. Lake Louise has a brand-new system constructed at a cost of about (inaudible) $3-1/2 million at Lake Louise, it has come into production activity within the past year. Waterton has a new system. I guess for our own system we have upgraded them. Many of the private ones are also in a state of improvement. We've got a twice-yearly six part review by the EPS, and their records have shown a very substantial improvement. There are some outstanding deficiencies left.

ENVIRONMENTAL PLANNING AND MITIGATION IN KANANASKIS COUNTRY

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INTRODUCTION

Kananaskis Country, first announced as an Alberta Heritage Savings Trust Fund Project by the Alberta Government in 1977, has been undergoing development for just over six years now. The conceptual planning for the development is largely complete and much of the detailed design and construction is fin- ished also. As originally conceived, Kananaskis Country was planned to pro- vide the widest possible range of outdoor recreation opportunities in a high quality natural environment. This aspiration is framed in the "Policy for Recreation Development of Kananaskis Country", which was prepared in 1977, and which set the initial environmental standards from which the Kananaskis Country environmental planning and mitigation approach grew.

Kananaskis Country occupies that part of the Alberta Eastern Slopes in the Bow-Crow Forest Reserve extending south from the Trans-Canada Highway to the height of land between the Highwood and Oldman River drainages; over 4,000 square kilometres of Rocky Mountain foothills and front ranges.

A substantial commitment to environmental quality already existed for the Eastern Slopes, as prescribed in "A Policy for Resource Management of the Eastern Slopes", released by the Alberta Government in 1977. This policy, in part the product of public hearings on environmental issues of resource management held during the 1970's, was a foundation for the Kananaskis Country recreation development policy.

Although outdoor recreation was the prime land use activity for which Kananaskis Country was dedicated in the development policy, there are alternate land uses in the region, which sometimes conflict with recreational uses. Very early in the planning process for Kananaskis Country an Integrated Resource Plan was initiated to guide future land use decisions. These broad policy-level guidelines provided firm environmental planning and mitigation direction for the participating agencies. They have resulted in the application of responsible, and occasionally novel, environmental planning and mitigation throughout the development phase of Kananaskis Country. This is not to say that environmental trade-offs have not occurred - they have, but with swift mitigation in the form of direct rehabilitation, replacement or enhancement in nearly all cases.

Today I would like to review with you the policy and planning framework under which the Kananaskis Country development proceeded, and the process by which environmental planning and mitigation decisions were reached. I plan to elaborate with several examples, in the form of very brief case studies, and to conclude with a look at the benefits of the approach taken to environmental planning and mitigation in Kananaskis Country.

PLANNING FRAMEWORK

The Kananaskis Country development has been guided since its inception by an interdepartmental committee of senior public servants representing nine key participating agencies of the Alberta Government. This committee was responsible for overseeing the design and implementation of the various capital development projects and for ensuring that their respective departmental requirements were presented and addressed in all aspects of the development.

The committee reported upwards through a managing director to a cabinet committee, via the Deputy Ministers of the participating departments. Public input to the Kananaskis Country development was made by a Citizen's Advisory Committee which interfaced between the interdepartmental committee, the public and the government. The Citizen's Advisory Committee reported to the Minister

of the Department of Recreation and Parks which is the lead agency for Kananaskis Country.

All agencies at the interdepartmental committee participated in the review and approval of all the dozens of individual projects which make up the Kananaskis Country development program.

ENVIRONMENTAL PLANNING AND MITIGATION APPROACH

The Kananaskis Country Interdepartmental Committee made all program, design, budget and implementation decisions for the development program, within the purview of the recreation development policy. This included matters of environmental planning and mitigation, and of allocation of budgets for these activities.

Kananaskis Country currently has an approved global budget of just over $250 million, distributed among the key sub-programs of public works, supplies and services; roads; primary recreation facilities; fish and wildlife enhancement; and administration.

Much of the environmental planning and mitigation approach for the Kananaskis Country development was adopted early in the program, during 1978 and 1979. At this time consultant-based overview assessments in resource inventory, recreation demands and uses, recreation systems designs for various facilities, and several large scale projects such as the golf course and off-highway vehicle area occurred. Each of these facets of the overall program contained an environmental assessment and mitigation strategy.

Several overview guideline documents began to emerge early in the development, including a design principles and guidelines document for facility development. The Fish and Wildlife Division coordinated the preparation of an environmental guidelines supplement to this document. The guidelines provided the environmental frame of reference for all subsequent developments, from equestrian trails to roads, culvert crossings of water courses, campground locations and waste management procedures to construction timing windows.

The participating agencies in the Kananaskis Country development delivered their respective sub-programs, according to individual departmental procedures, with in-house staff, specially employed project staff, consultants or with combinations of the foregoing. Each major project or grouping of similar projects (e.g. Campgrounds, day use sites, equestrian trails) was designed under the guidance of a review group made up of the participating agencies with operational interests in that facet of the program. In the beginning these groups, and the interdepartmental committee, were multi-disciplinary in nature. With experience, however, the planning approach became increasingly inter-disciplinary as staff gained better understanding of the many professional management, development and operational disciplines involved in the development program.

Not all of the development issues were smoothly resolved at these review groups, but most of them were. Nor were all aspects of the development process in place and functioning effectively from the beginning of the development program. The basis for the environmental planning and mitigation approach was in place at the beginning because of the Eastern Slopes Policy, but formal environmental guidelines and working applications of these procedures evolved over the first two years of the program.

I want to go on to describe, through several examples, how we addressed some of the environmental planning and mitigation issues in practice.

CASE STUDIES

It is a little difficult to select, from the hundreds of projects which make up the Kananaskis Country development program, those examples which best demonstrate the application of the environmental planning and mitigation approach.

Each project within the Kananaskis Country recreation development program contained, as part of its design and approval, an environmental review and mitigation facet appropriate to the location, scale and function of the project. Accordingly, roads and major campgrounds had environmental impact

assessments and mitigation plans completed prior to approval, and were then monitored throughout their construction. A hiking trail or program to stock trout in a high mountain lake might have a less formal assessment and plan devised by in-house environmental staff in the implementing and affected agencies.

I want to begin with a brief overview of how we applied some principles of land use zoning to separate and constrain the developments throughout the region. Following this four examples describe how we proceeded with some general, and some specific, environmental planning and mitigation challenges.

Zoning Concept

Superimposed upon Kananaskis Country are the land use zones prescribed in the Eastern Slopes Policy, designed to secure those lands requireed for watershed, fisheries, wildlife and forest management, and to provide for the orderly use of the region's natural resources. Within this zoning the Kananaskis Country Recreation Development Policy applied a further zoning of recreation facilities and activity areas.

The Kananaskis Country developments were designed around the major drainages of the area, with different corridors receiving different intensities of development according to historical use, available recreation opportunities and with a view to separating non-complimentary uses. Along the river valley corridors were selected nodes for relatively intense development to provide focal points for activity staging - trailheads, parking, camping, services and other intensive activity facilities. The Kananaskis Valley was selected for the highest intensity development, followed in descending order of intensity by the Elbow, Sheep and Highwood Valleys. Backcountry development of trails and campsites was similarly staged in intensity so that the hinterland access and recreation facilities available from the valley corridors ranged from relatively extensive and sophisticated in the Kananaskis Valley to nearly undeveloped in the Highwood Valley. One key contributing factor in the zoning process was the location of important fish and wildlife populations, and their habitats.

Several major developments, such as the golf course and off-highway vehicle area, were located where sufficient land of the required capability could be found. Happily, within the 4,000 square kilometres of Kananaskis Country there is an abundance of space and resources - sufficient, in fact, to have absorbed these developments and their related activities while preserving the aesthetic character of the region, and retaining a high proportion of relatively remote, undeveloped wildland.

SOUR GAS DEVELOPMENT

Natural resource extraction industries, including oil and gas exploration and development, continue to be provided for in Kananaskis Country, constrained by the zoning applications of the Eastern Slopes Policy and the recreation facility developments.

The eastern portions of Kananaskis Country contain natural gas deposits of sufficient quantity to have merited extensive testing and development for many years prior to, and after the Kananaskis Country development began. Many seismic operations were conducted and test wells were drilled during the development phase, and one major development application was made to the Energy Resources Conservation Board.

Shell Resources Canada Ltd. applied in 1981 to develop several wells in the vicinity of Moose Mountain, in the Elbow River drainage, and to pipe the gas through Kananaskis Country to the Quirk Creek Gas Plant. Shell made its development intentions known to the Kananaskis Country participating agencies early in their planning process. They worked very closely with government staff to design the wells, collecting system and pipeline to overcome impacts on forestry, fisheries, wildlife and existing recreation facilities. The resulting application met every biophysical environmental requirement that the agencies had, but it was rejected by the Energy Resources Conservation Board on the grounds that the question of public safety in the Elbow Valley was not adequately addressed. The gas in the Moose Mountain field is very high in H_2S content, and the Alberta Government intervened in the application hearing to raise the question of public safety. Shell participated with the

Departments of Environment, Recreation and Parks, and Energy and Natural Resources to study the dispersion climatology of the Elbow Valley and to conduct a risk assessment of an hypothetical failure in any component of the proposed sour gas development. The results of this work satisfied all further questions of public safety associated with the sour gas development proposal. The risks were shown to be substantially less than many risks accepted as part of day-to-day living, most notably the risk associated with driving from Calgary to Kananaskis Country in a private car.

Three lessons were learned from this experience. First, that Kananaskis Country had sufficient room to accomodate both the new recreation facilities and activities, and traditional natural resource industries. Second, that a major extractive resource development could be designed cooperatively by industry and government to mitigate the principal environmental concenrs - mainly through appropriate design. And third, that the public interest was well served by the Kananaskis Country environmental planning approach, which posed the question of public safety, and proceeded to work with industry to resolve it.

LANDSCAPE REHABILITATION

Many activities in Kananaskis Country had left their mark on the landscape prior to the recreation development program and were not subject to mitigation as part of any of the many development projects. Yet, particularly from the perspective of aesthetics, these prior land uses continued to have a negative impact on Kananaskis Country. To address these inherited impacts, the Kananaskis Country development program included a landscape rehabilitation project. Where no other project could reasonably include rehabilitation or reclamation of an existing land use within its design, the landscape rehabilitation project was used to mitigate the impact.

Each year an inventory of sites was compiled from the participating agencies and priorized. A rehabilitation assessment and prescription was prepared for the sites and, typically, the rehabilitation work was completed in concert with other major works in the vicinity. Much of the intent of this

project addressed problems of aesthetics, primarily within the views from major facilities or roadways. Problems of erosion, public safety and unauthorized off-highway access were addressed as well.

FISH REARING STATION IN A PROVINCIAL PARK

One of the projects included in the early Kananaskis Country development program was the construction of a fish rearing facility intended to rear trout for stocking in Kananaskis Country waters. Fish Culture facilities, especially rearing stations, require a large volume of water of exacting environmental qualtiy.

An extensive survey of Kananaskis Country surface water and ground water resources demonstrated that the water requirements of volume and quality were nearly mutually exclusive in this region. One site best met the requirements, but it was located in Bow Valley Provincial Park, at the entrance to the Canmore Corridor.

The site is a ground water spring formally called Many Springs. Local knowledge, and preliminary ecological inventory work, ascribed to the site a number of environmentally significant attributes, including the hydrogeological fact of the spring itself - a warm water, nearly constant flowing ground water source of excellent water quality and volume. Not only was the Many Springs site ideal for a relic invertebrate species, and its associated fen critically important for an apparently unique floral community, it was perfect for a fish rearing station. We began the design.

Part of the design process included an environmental assessment and mitigation strategy. Consultants were employed, in-house staff were industriously applied and ground water pump-tests and drawdown regime analyses were conducted. An impact assessment model was designed and the predictions were found to be unacceptably severe. The water requirements of the station would have seriously affected the vegetation communities which depend on the springs. As a result, no fish rearing station is now planned for Kananaskis Country. Fortunately, the capacity of the Provincial fish culture system is

expanding elsewhere in Alberta and we are able to stock Kananaskis Country waters as planned.

Two excellent lessons were learned with this exercise. First, the process of environmental assessment was sufficient to identify the problem, to address it, and to reveal the potential consequences. Second, an intended multi-million dollar development did not proceed when the assessment was known and the residual impact was weighed - we had "The Right Stuff".

BEAR STUDIES FOR RECREATION PLANNING

It is difficult to imagine proceeding with a recreation facility mega-project in the Rocky Mountains, adjacent to Banff National Park, without a sound knowledge of the two wildlife species which seem to have the greatest emotional, and sometimes physical, impact on outdoor recreationists - the grizzly bear and the black bear. Yet, when the Kananaskis Country recreation development began we knew relatively little about bears in the region; certainly insufficient to be confident of avoiding major problems in all cases.

I can recall three key decisions being taken, which in hindsight appear to have been correct. The first was to devise a solid waste handling standard for all Kananaskis Country facilities to prevent a nuisance bear problem from arising. The initial investment in design and equipment, supplemented with an intense operational commitment to solid waste removal and public education has, so far, helped to avoid the troublesome and occasionally tragic problems encountered elsewhere.

The second decision was to delete major campground development in the Burstall Lake - Mud Lake area of the Smith-Dorrien Valley. This area was known to contain grizzly bears and was suspected to be part of a movement corridor for these animals between Banff National Park and Kananaskis Country. Subsequent study of bears in Kananaskis Country has demonstrated the wisdom of this decision.

Third, we played catch-up, and employed our in-house staff and Dr. Stephen Herrero to bring us up to date on the locations of preferred bear

habitats and on the ecology of bears in Kananaskis Country. We found that grizzly bears are more common and wide-spread than many of us formerly believed. We have re-routed certain trails and moved to alternate designs for others. We manage problem black bears on a sounder biological basis than before and we know where to expect grizzly bear problems in the back country. Better for us, better for the recreationists and, of course, better for the bears.

BENEFITS OF THE APPROACH

I learned some time ago that in planning, whether it is of buildings or municipalities, engineering systems or environmental work, there must be measurable benefit by which success can be evaluated. In the Kananaskis Country experience there are a number of measurable benefits which have been produced by the approach taken to environmental planning and mitigation.

Secondary benefits first; secondary only in that they are not those by which the environmental planning and mitigation approach will be finally measured. But they are important nonetheless. One of these is that the government agency-based committee approach to project managment provided for a cost-effective and expeditious development process in environmental matters. When the Departments of Transportation and Parks needed gravel for a road or a campground facility the environmental management agencies responsible for water, and the animals in it, did not erect obstacles to excavation in the name of environmental impact. Instead, we jointly designed put-and-take fish ponds, sometimes known as gravel pits, dressed them up with picnic sites, and achieved multiple objectives for the same excavation dollar.

The identification of enhancement opportunities in seemingly unrelated, or even opposed development projects, provided an ongoing forum between the participating agencies in the Kananaskis Country development leading to improved understanding and cooperation in delivering complex public service goals. These beneficial working relationships, and the examples which stand behind them, will provide a long-term benefit beyond the physical and temporal limits of Kananaskis Country.

The foremost measure, however, must be in terms of the primary public benefit derived from the final product. We learned during the Eastern Slopes hearings of the 1970's that Albertans wanted an outdoor recreation alternative to the national parks, that they were unhappy with the environmental impacts resulting from some of their own recreational activities, that they found some of their varied outdoor pursuits incompatible, and finally, that they wanted to ensure that whatever facilities were developed in the Eastern Slopes retained or enhanced the high quality of the natural environment.

Clear water, abundant fisheries, wildlife and forests and hundreds of square kilometres of wild back-country scenery are still to be found and enjoyed in Kananaskis Country. Access and facilities are there for everyone, from the independent, self-contained back-country hiker, hunter or fishermen to be disabled, the facility-orientated camper, golfer or picnicker, or the casual Sunday afternoon driving visitor.

I am convinced that in this undertaking known as Kananaskis Country, Albertans have been well served by our approach to environmental planning and mitigation.

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DISCUSSION

ED BRUSHETT, Energy Resources Conservation Board

One question I have of you: I believe that the integrated resource plan for Kananaskis Country was one of the first to be put together into print and put to use. I'm curious to know whether you think that the document that was generated sort of meets the situation as it is today. In other words, did that integrated resource plan do its job in your case?

T. MILL

The plan was one of the first started. It's not yet complete. It's at, I think, I referred to it as one of the three guiding policy documents. I don't want to speak for the resource planning process because I'm not intimately associated with it in my job, and I wasn't in Kananaskis Country; it was a parallel development. But the process, briefly, goes through an inventory and review phase, a number of public input phases, some joint planning developments, and produces a series of documents that move through an approval process until a policy document, a resource management plan, policy paper, is produced, which is reviewed by government, and once it gains a level of approval it goes into a formal plan, which is then applied over a five-year period with subsequent review. That has not yet been achieved. The Kananaskis Integrated Resource Plan is still at the policy stage. As far as whether or not it was appropriate, it was useful. It focussed an awful lot of our resource management attention in the different agencies, Energy and Natural Resources, Environment, and Recreation and Parks in particular, on the problems of the day - how to put things in juxtaposition so we could continue to have elk and sheep and water and grass and trees, as well as giving people access to go and do whatever they wanted to do with them in some orderly fashion. It was very useful for that. It was extremely useful. Whether it's appropriate to carry on, it has to be. The product that comes out will have to be, and I don't forsee it being approved until it is workable. Certainly, it was designed with full knowledge and input from the Kananaskis development side, so it's an integrated resource plan that has a very large component of

recreation dedication in it. I can't really give you a much clearer answer than that, Ed.

CARL SURRENDI

Tom, are you aware of whether or not they've constructed any of those villages they were looking to put into the actual valley itself at this point?

T. MILL

None have been constructed.

C. SURRENDI

Have they selected any sites?

T. MILL

Yes, there is a site located on the bench at the foot of Mt. Kidd in the Kananaskis Valley overlooking the Kananaskis Golf Course. Some of the infrastructure is in there as well, the sewage handling and water utilities stuff is into the site for the development when it goes ahead.

C. SURRENDI

Thanks.

JEFF GREEN, LGL

Tom, I was wondering, now that the development of Kananaskis Country is complete, are there any studies, ongoing studies now, or are any studies planned to either assess the effects of the development on wildlife and fish, or to document the success of your mitigation and enhancement methodology?

T. MILL

I thought this talk was it. Kananaskis Country isn't complete. The project was phased - we didn't want to shut down every road and every campground and every mountain trail from 1978 on and let nobody get out there while we built it. So it's been a phased project. The bulk of it is complete, but there are a number of projects, and Carl's question on the alpine village was a case in point, that the actual buildings themselves are not even started yet. But the bulk of it is done. The heavy duty stuff is in, the golf course is done, the Kananaskis Park is complete, quite a number of the roads have been developed and finished off, and campgrounds and picnic sites. We coincidentally, just prior to Steff calling up and asking me last September if I would come here, had started a retrospective analysis within Kananaskis Country of our environmental planning and mitigation performance, for the whole project. So in fact, yes, there is a review, it's ongoing, and I guess an awful lot of what happens in the future will be in the way of evaluating whether people are satisfied with the recreation experience they get out there, if there are enough elk to satisfy the viewers and the hunters, and enough fish to satisfy the fishermen and enough mountains and space left for the people who go backpacking or driving through Kananaskis Country, then in that regard, anyway we'll say "yes, we did a good job". There is ongoing work of a regular operational nature. There are people in Fish and Wildlife conducting surveys at intervals as part of our management requirement, and we'll continue to do that, and so will the other agencies. It's important to remember that at some point in time the development process has to formally conclude. It can't go on forever. It has provided jobs for me and a lot of other people, and many of you consulting people in engineering and architecture and environmental work for quite a few years, but as a matter of fact, yesterday was the concluding meeting of the Kananaskis Country Inter-Departmental Committee and, although some capital development will continue for the next year or two or three, to finish off what has been begun, it'll be handled by the operational people as a small facet of their responsibilities.

DAVE REID

With respect to Mount Allen, what sort of mitigative measures are planned to protect the wildlife in the area in the event of a downhill ski development?

T. MILL

With the Chairman's indulgence, that's not what I came here to talk about, but I'll make a comment, if that's all right, Steff. I was pleased to hear from Dr. Leeson that bighorn sheep, especially, are quite adaptable to blasting, and trucks, and construction, and other development activity. That's our experience in the Canmore corridor with the reconstruction of Highway 1A and that's one of the things I expect to see at Mt. Allen. You said, "If a downhill ski development goes ahead there". It should be clear that a downhill ski development will go ahead at Mt. Allen. It has been approved, it has been budgeted, and it will be constructed in 1984 and 1985. There is an environmental protection plan included in the master plan, which I helped to guide through the planning process over the last six months, and indeed which people in my department and in a number of other agencies, both from the Kananaskis Country Development Program and through our other operational sectors of our departments that have been working in Alberta and would be working whether we developed Kananaskis or not, have put together. I don't think this is the forum to address the specific techniques that we're going to apply there, but, in summary, the problem boils down to, as we see it, bighorn sheep, something with elk, and perhaps some problems with grizzly bears. The Mt. Allen ski development is separate from the lands of most consequence to these animals, physically and visually in large part. I guess if I can fall back on something I said in this presentation, appropriate design was the solution to many of our problems of environmental impact mitigation and that's where we're going with Mt. Allen as well. I'll talk to you later if you like, I don't think I can go much further here.

ENVIRONMENTAL MITIGATION

THE PAST - THE FUTURE

ALEX HEMSTOCK

President Elect
Engineering Council of Canada
Calgary, Alberta

When Don Dabbs first asked if I might speak to your meeting I accepted because of my interest in the topic he suggested. As I understand it the main thrust is to provide some ideas about where we are going and I thought I had some new ideas about the future. The speakers at this conference have in fact already introduced several of those ideas. Nevertheless, it may be useful to decide where we are now and how we got there. I know many of us have seen substantial changes in the approach to environmental assessment - and it is reasonable to expect further changes.

I propose to review with you the past two decades and try to analyze them, briefly discuss the current status of environmental mitigation and then look at future trends.

THE PAST

The sixties have been described as the ecological decade, a time when a broad segment of the public became aware of the importance of the natural environment to continuing human welfare. There was at the same time, an increasing awareness of man's abuse of that environment.

The widespread and indiscriminate use of chlorinated hydrocarbons and organophosphate insecticides, as well as the chemical herbicides were some of the first environmental hazards which concerned the layman. Rachael Carson's "Silent Spring" (1962) was one of the initial stimuli to this development. The book contains several references to Canadian problems and researchers.

Other instances which attracted the public's attention included the smog problems of London and Los Angeles, the unforeseen detrimental side effects of the construction of the Aswan High Dam in Egypt, the effectiveness of the Soviet scientists in protesting the pollution of Lake Baikal and the series of marine accidents in the late sixties which caused oil spills on several miles of coastline at various locations in the world.

It was the belief of many that the growth of industrialized society and its offensive byproducts threatened the integrity of our planet's biosphere, that thin envelope of atmosphere, soil and water that surrounds and nourishes all life on the planet. There was a shift in political goals, "quality of life" and "environmental quality" became important words in the reassessment of national and international goals.

For a vocal minority one might summarize their theme as "Stop the world we want to get off", others including your honored guest, Dr. Bill Gunn say, "Let's work at helping to keep our country, the best place in the world to live".

In Canada, our first ecological awareness probably originated and was fostered in the United States, however, there was concern expressed throughout the world that civilization was facing an environmental crisis.

The first thrust of the general public was to ensure that pollution was controlled and that exploitation of natural resources be regulated. It was recognized there should be environmental protection and restoration. The concept of environmental impact assessment as part of a planning process evolved later from these earlier objectives.

Undoubtedly, the technological goal of modern society that has received the greatest criticism from environmentalists and social philosophers is the goal of economic growth. Lewis Mumford (1970) wrote "the chief premise common to both technology and science is that there are no desirable limits to the increase of knowledge, of material goods, of environmental controls; that quantitative productivity is an end in itself, and that every means should be

taken to further expansion". Another characteristic of technological society that has been identified for criticism, is its basic chauvanism. All other systems are classified as lesser systems - "outdated", "primitive" or "backward", these other cultural systems are viewed as impediments to progress, where that goal is usually defined as technological or economic growth. Other social organizations and values are expected to change in the face of technological development.

In summary then, there was during the 1960's and 1970's a great ground swell of public protest against developments or activities which risked changing the environment. Milestones such as the reports of Doomsday by the Club of Rome and the U.N. Stockholm conference focussed attention on the need for much more control, particularly in resource development projects. In fact, it was often claimed that non-renewable resource development should be stopped in favor of development of renewable resources.

Let's briefly look at the reaction of various actors to this series of events.

Government

In the United States, the development of the National Environmental Policy Act of 1969 (NEPA) brought the first legislation on environmental impact requirements into being. Not only were proponents required to evaluate the "impacts" of their project but they were required to show that alternatives to the project had been considered. It was under this act that a preliminary injunction was granted against the issuance of a permit for the Alyeska pipeline on the grounds that adequate environmental impact statements had not yet been published.

In Canada, both Federal and Provincial agencies have issued guidelines for environmental impact assessments and they have defined those projects which require assessment. The subject has also been the focal point of several public conferences.

The first Canadian parliamentary approach to the matter of environmental impact was the issuance of the Northern Pipeline Guidelines in August 1970. These were reissued as expanded guidelines in June of 1972. The early guidelines were very general and two main goals were listed:

- to give further guidance to industries engaged in research and planning in connection with pipelines; and

- to provide for opportunity for northern residents, natives and other interested parties to make observations.

You will note that not only did the northern guidelines define requirements with respect to details of environmental impacts but also with respect to social impacts.

Here in Alberta, a Department of Environment was formed in 1971, and in 1976 the Alberta Minister of Environment issued "The Alberta Environmental Impact Assessment System Guideline". To quote from the executive summary, these guidelines are to be followed by the proponents of the proposed developments that have been requested by the Minister of the Environment to prepare and submit an environmental impact assessment report. The purpose of the report is to provide comprehensive information to the public and the Government of Alberta in order to facilitate the early identification and resolution of potentially significant adverse environmental effects of proposed resource development".

We have heard much at this conference about what is going on in government - but before leaving the subject, I offer a few personal comments on the government role.

It is of utmost importance that the government look at long-term problems, rather than just react to problems. For example:

- Government leased Arctic lands in the late 1950's and exploration work began in the Mackenzie delta area in 1962. Twenty years later,

industry was told proposed projects couldn't go ahead because the government hadn't had time to do any land use planning.

- In Alberta, guidelines are just now being set up for abandonment procedures for oilfield facilities. Since some facilities are now being abandoned, earlier availability of such guidelines would have been helpful.

- This morning, Mr. Smith from Alberta Environment indicated that a study in 1980 showed no damage from SO_2 in certain areas in Alberta. Isn't the real concern with respect to SO_2 the matter of long-term and national or international aspects of "acid rain".

Perhaps governments are remiss in not doing more with respect to the long-term, but we as professionals have a very real responsibility, too.

Industry

Industry reacted to these new requirements according to the many and varied company characteristics. Some ignored the pressures, some hid their heads in sand hoping the environment would go away, others got on the band-wagon. Almost all complained about time delays and rising costs.

One response to public pressure and regulatory EIS requirements was to produce massive volumes of baseline data with minimal amounts of impact assessment. There were also, those thin little reports with little data and unreasonable arguments that there would be no impact. For some time the corporate attitude was that environmental issues were outside the normal course of business and could be handled on an "ad hoc" basis. This at best led to disjointed planning - and at worst to a "knee jerk" avoidance of environmental affairs.

Yesterday, Malcolm Ross assured us that industry now places environmental input into the early planning phase; equal in importance to economics and environment. I am not certain this is so, but I believe the trend is in that direction; certainly it is necessary.

Public

The public became involved to a great extent in the decision making process. Today's instant communications make the public better informed, but at the same time more likely to be swayed by the popular media hype of the times. The public pressured industry and politicians to be more responsive to environmental concerns and by vociferous pressure on those politicians and regulatory agencies, and in regulatory proceedings they were very persuasive. Initially, the approach was to paint horrific "what if" scenarios upon which doomsday conclusions were drawn, much of which may have been merely to draw attention to their concerns. Gradually the trend was to much more constructive dialogue - and a permanent and useful place in the scheme of things. The public's main concern may now be with socio-economic rather than environmental factors.

Professionals

All of this generated a new profession commonly now referred to as "environmentalist". I am sure that it is the main reason that there is today an Alberta Society of Professional Biologists.

These professionals come from several disciplines including agriculture, forestry, engineering and all facets of biology and social sciences. For all of us there was an intense period of learning and developing. Those from engineering had to learn to evaluate factors that couldn't be quantified and those from science had to learn the pragmatism that goes with decision making. There are those who would like to make a science out of writing environmental impact statements, our goal should be to make a science out of Environmental Protection. It is fair to say that this new profession is still not clearly defined but has made amazing progress in a few short years.

Summary

So here we are in 1984 - government, industry environmentalists and the public having come a long, long way in the past two decades - all able now to

talk environmental mitigation in a reasoned way based on better knowledge and experience. Much of the direction in the future will depend on you and your profession. Remember the ultimate goal is not to write a perfect EIS, nor is it to answer all the questions at a hearing - or if you are a regulator to hold two or three hearings on the same subject. The ultimate goal is proceed with necessary development in a logical, cost effective way - and to protect the environment while so doing. This applies not only on a project basis, but also on a broad basis which considers long-term planning and cumulative impacts.

THE FUTURE

Let me list for you five major trends which I believe are important, in fact I believe we should strive for them.

1. A general agreement on the part of industry that environmental protection planning is an accepted and necessary part of overall planning. Too often in the past the environmentalist was called in when plans were "fait accompli". All that person had to do was bless (and defend) decisions which were already made - decisions in which he or she had no part.

2. Environmental planning will be long term, it will begin when economics, politics and engineering are first considered at the initiation of the project. The costs are minimal and the contribution can be very positive to overall planning. The only caveat is that the professional environmentalist must bring pragmatic and experienced judgement into the planning process.

3. There will be a reduction in the overlapping demands of government bureaucracies. A typical current example is the overlap between COGLA, NEB, FEARO, on the part of the federal government along with provincial or territorial concerns on the same projects. Keep in mind the hundreds of other permits and controls under this level of bureaucracy. The current need to file two similar sets of documents and proceed through two hearings on that similar material is

ridiculous. It is unfortunate but to some the regulatory process has become an end in itself. It is only a part of overall environmental protection.

4. There will be an improvement in our own capability as professionals to prepare more useful environmental impact statements. More professional judgement will go into the determination of what is important. There will be a considerable reduction in volume of material and an improved capability to express in simple terms what the real issues are and how the environment will be protected. We must remember the EIS is not a scientific document, nor should it be evaluated by its weight.

5. There will be more emphasis on inspection and monitoring. Monitoring is the only way to determine performance of protection measures. It will provide the concrete evidence upon which we can improve our assessment and mitigation methods. It has the double benefit of providing a measure of effectiveness of protection hence ensuring performance and as well providing knowledge and experience for future projects.

These five trends are not revolutionary, in fact, I believe we can fully expect to make such progress.

Let me quote a few leading ideas from John Naisbitts' - "Megatrends" which talks about ten major transformations in our current society. The "megatrends" include such shifts as: industrial society to information society, forced technology to high tech/high touch, short term to long term, representative democracy to participatory democracy.

> "None is more subtle, yet more explosive, I think than this first, the megashift from an industrial to an information society".
> "We now mass-produce information the way we used to produce cars".
> "The new source of power is not money in the hands of a few but information in the hands of many".

And with respect to the trend from short term to long term planning, he comments:

"During the past decade the debate over the environment and nonrenewable resources has raised our collective conciousness about the danger of the short term approach. As a general proposition, we have become much more sensitive to the longer range implication of our short term action. It has become apparent to most people, for example, that the short term convenience that encouraged us to pollute the air and water was not worth the long range damage done to the quality of our lives and the environment".

Finally he observes that those developments within society which rise from the grass roots are here to stay and he uses as an example the environmental movement - "Its here to stay".

To summarize:

We should expect that there will be an acceptance by industry that environmental planning is a valid and reasonable part of overall planning.

We can hope, and there are reasons to expect a reduction in overlapping demands of government bureaucracies and perhaps even a "one window approach" that works!

We should strive for more capability as professionals to prepare more useful social and environmental impact statements and to bring better judgement to bear in the planning process. As Mr. Brushett noted, communication is essential.

We should call for, and professionally undertake, more monitoring to ensure that our evaluations are correct. We as professionals, must advise what factors should be monitored and plan programs that will provide long-term information.

We should look forward to less emphasis on the regulatory process, more on environmental protection through mitigation and monitoring. Another way of saying this is less emphasis on Environmental Impact Assessment and more emphasis on Environmental Protection Planning.

DISCUSSION

PAT DUFFY, FEARO

Rather than make a comment, Alex, I wonder if you could say a few words about the efforts that are currently under way to reduce overlap in reviews that you're aware of. Maybe I can help you.

A. HEMSTOCK

You probably need to help me on that. I know that there are discussions going on at senior levels between the National Energy Board and other government agencies to reduce that duplication which I spoke of, and I could give as an example, I think, the hearing process that was undertaken in Nova Scotia with respect to the Venture project, which did provide for a provincial and federal coordination on that hearing, on the hearing process. That's about all I know, really.

PAT DUFFY

Permit me to add a couple of comments to those facts. In the real world, we do have federal, provincial, and territorial governments which have their own mandates with respect to environmental assessment and planning of projects. The overlap that you refer to is very serious. I think it's well-recognized by government and industry, and the Venture project is an example, of course, of where there has been collaboration to deal with two jurisdictions and their review of a project. At the present time, FEARO, NEB, and the Department of Indian and Northern Affairs have work underway to, if I can put it this way, stay out of each other's way, stage their reviews in such a way that they are not overlapping, and are held at the same time. This work is still underway, but it's a very high priority, and, from the standpoint of the office in which I work, FEARO, I can say that it's a top priority. Just last week, with respect to the Slave River Hydro Review, there was a press release on the plans of the federal and provincial governments to collaborate to hold a joint reveiw of that project, if and when that review is required,

rather than to have a separate federal and a separate provincial review under an EARP panel and the ERCB. Your point is well taken, but if I can offer the observation that progress is underway on one of these points that you predicted. That'll do it. Thanks.

SYMPOSIUM RAPPORTEUR[a]

DR. WM. FULLER

Department of Zoology
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I'm not sure I was supposed to comment on what Alex had to say, but Alex's was one of the papers I had well in advance and I read it some time ago, and underlined a lot of things. I see he's filled a few more things in. I don't think I've ever told Alex this, but I think the first time we met was a (inaudible) conference in 1969. My recollection of that was that there was a group of oil industry people at a table, sort of isolated and sitting by themselves, and it was the first time in my experience that I'd come face to face, or head to head with people from industry, and I think it was one of the first times the industry people had been sitting in a room full of people with other interests. And over the ensuing 15 years, I've bumped into Alex once in a while, on various occasions, and clearly the ideas he's presented in the paper he just gave us are ideas that would not have occurred to an engineer 15 years ago. Do you think that's a fair statement, Alex? In my view, 15 years ago I said an engineer was a man without a conscience. Well, to most biologists too, that's true. So I think we have come a long way, and I think Alex has laid it out very well.

I'm going to take one other thing just a little bit out of the order that I've worked out, which I'm not sure is a very good order because you don't have much time to do this sort of thing. I'm going to talk about a few words, and I noticed that Alex used the word pragmatic. I looked it up in the dictionary because I thought I knew what it meant, but I found that the first two words (inaudible) given for "pragmatic" were "meddlesome" and "dogmatic". That wasn't my concept of what the word really meant. If you read a little

[a]Transcribed from taped proceedings

further, though, you find that it's "treating facts of history with reference to their practical lessons". I think this is the meaning that we're looking for with basing our decisions on past experience.

Well, I think there are only maybe two reasons why somebody would take on a job like this. Maybe you can come up with some others. One of them is you have to be a terrible egotist. I don't look on myself as that. The other is you have to be stupid and I don't look on myself as that, so I really have to find a third reason. Maybe you can help me on that. I've done it before a couple of times so I knew what I was in for, and you always take an awful chance when you do this kind of thing. It's so easy to goof it or make a fool of yourself and I don't particularly want to do that in front of some of my former students and friends and associates.

However, I think the first comment I have concerns the title of the symposium, "Mitigation: Solutions to Problems". That implies a problem-oriented approach to things and I think the problem-oriented approach is a little too narrow. I think Alex was pleading for something larger than just specific problems, find a specific answer. There have been one or two other indications throughout the symposium, and I think perhaps the paper of Dr. Leeson's, on the national parks, was one of the best examples of this, where we have to treat the problem in a more holistic way, as a system rather than a series of individual problems. We've got a series of mostly interelated problems. They may have synergistic effects, they may have complementary effects. I think of all the professions that are involved with this ecologists ought to be the ones who think in systems. I think most of the professional biologists in Alberta have had ecological training of some kind. So we should be looking at things in terms of systems. We use terms like ecosystem, and we speak about the biosphere, and we have a different approach to the biosphere than economists do, for example. At least we should have. To biologists, the biosphere is what keeps living systems going. It's essential to our existence on this planet. To the neo-classical economist, the biosphere is the source of resources. We can harvest these things at will, there are strictly no limits on it. When we run out of resources, we replace resources with capital or technology, and there is no end to it. If you don't

believe that, pick up Julian Simon's book called "The Ultimate Resource" and you can see it in chapter and verse. So we should respect the biosphere and ecosystems as systems, and as necessary life support systems.

Now, the reason some of us don't do that, perhaps, comes back on people like myself; perhaps those of us who are teachers fail to make the integration that we should make. We split biology up into botany and zoology and genetics and biochemistry and what not, and we subdivide each of those divisions, and kids take 20 or 30 courses and nobody even puts all of this stuff together in a systematic way.

Well, I said I was going to say something about words, a few definitions. I looked up "mitigation", too, and a couple of other people did. First, in the Oxford dictionary, I found it came from the Latin adjective "mitis" meaning "mild". So I went to the source, my mother's old Castle's Latin dictionary of 1922, and found, indeed, that there is a Latin adjective "mitis, mitior, mitissimus", for those who remember their Latin. It has a comparative form "mitior", and a superlative form "mitissimus", meaning "milder" and "very mild", of course, or "most mild". But the word is formed only from the adjective, so it does not mean "to make things better", or "less something"; it's not in the comparative degree. It doesn't mean "to minimize" because it's not in the superlative degree. It simply means, it has something to do with mild. There is a Latin verb, "mitigare", formed from this adjective, and a short Latin verb as well. And I went even to a higher source than this. My son-in-law happens to be visiting right now. He's a professor of classics and Latin specialist. He told me that this word is a peculiar form of a Latin verb, but it means "to strive persistently to make mild". It's a continuing action, it's not a single sort of action. It's a continuing action, to make something mild, or to alleviate something. So this is the source of the thing.

Now, it seems to me that Mr. Ross defined the word essentially correctly, because the Oxford definition is correct, "to make mild", but devoted most of his talk to reclamation. I don't think most of the things he talked about were really mitigation. When you rip a 70-metre wide channel through the

earth, and then put the earth back, that's hardly mitigation. I think you're reclaiming it.

Mr. Smith, this morning, I think, didn't even come close to the meaning of the word mitigation.

Another word that's a pet word of mine is "development". "Development" is a biological concept fundamentally. We use it in a number of senses, as a euphemism. Garret Hardin has written a little essay on euphemisms. You've got to get behind these euphemisms and go back to look at what they really mean. Euphemisms are nice words used to cover up words that we don't want to use. We use "development" simply as a euphemism for "exploitation". "Exploitation" doesn't have a nice sound to it, and "development" does, so we don't use "exploitation". But that's basically what we're talking about. The biological term "development" is not synonymous with "change", as somebody said today. I think it's synchronous with change. You can't develop without changing. Change goes on synchronously with development in the development of an organism, or in the development of an ecosystem, the process of secondary succession, for example. But the two words are not synonymous. The two things go on synchronously, but the two are not synonymous. Not all change is development, in other words.

Now, in a developing organism, the changes that go on, of course, are aimed at furthering the future existence of that organism. Things unfold in the normal case of events at the right time in the right direction in the right amounts. And if so, a healthy organism results. If something's wrong with the genetic information, if the program goes wrong, then you get some sort of a monster.

So, when we're thinking of environmental things, what will be the analogue of our organism? Society, or the environment as a whole? And how do we arrange these activities so that they will, in fact, model development and if the changes will be in the right direction and will promote the things we want to do instead of being in the wrong direction and give rise to a monster? I suppose this comes a little bit close to Cass Lindsey's remarks about getting

the kind of dragon you deserve. If you mistreat the environment, the environment fights back, as it has in the Western European dragon - the European dragon as opposed to the Asian dragon.

Now, "impact" is another word and we were told, I think by Mr. Ross again, that impacts could be good or bad. I think that's true. But, I've been thinking about this, and I think it depends on whether the impact is planned or unplanned, planned or random. If you want to drive a nail, there has to be an impact. You take a hammer and you take a swing at that nail, and if you drive the nail in, that's good, that's the favourable outcome that you're looking for, the planned outcome of that impact. But if you hit your thumb, that's unplanned, and that's not so good. And if you drop a hammer on a window, that's not so good, or if you take a hammer to your TV set because it doesn't work. These are all impacts, but the only one that is favourable is the planned one of driving the nail. And unplanned, or random impacts are, I would guess, almost universally bad. The probability of a random impact being good, I think is not very good. So I don't think it's improper to use the word "impact" in a generally negative sense, when it refers to unplanned events, and essentially the things, the side effects, externalities, as we sometimes call them, of development or exploitation schemes, usually fall in that ballpark.

Now environmental quality has been mentioned several times, but I think not defined. Maybe the nearest we came to a definition was this morning when Mr. Smith told us about the monitoring of air and water quality. But we're then defining it in terms of how many "baddies" there are, and how many "baddies" we can put up with. And we're really only told some things about air and water quality. At that stage, we weren't told anything about some other aspects that I think are important in environmental quality, such things as maintaining just natural beauty just for its own sake, the opportunity to go out into the wilderness and get lost, the opportunity to meet a grizzly bear, maybe get killed; these are all aspects of environmental quality, I think, that you can't measure by measuring chemicals.

Well, those are a few words. Now I have a few comments about economics and economists because Alistair Crerar is sitting over there. There was an

economist, John Maynard Keynes, who wrote these words in 1936. He was a pretty smart guy, I believe. "The ideal of economists and political philosophers, both when they are right and when they are wrong, [note that - and when they are wrong] are more powerful than is commonly understood. Indeed, the world is ruled by little else". Now, Alex and the other engineers here, I think for a long time, belaboured under the impression that engineers rule the world. But we see, John Maynard Keynes knew in 1936 that it's economists that rule the world and they rule it whether they're right or whether they're wrong. Now I don't think we can put up with that kind of crap, you know, because they're wrong more often than they're right. Now the latest thing is, the current issue of Saturday Night. There's an article in here called "Fools' Paradise", subtitled "The decline and fall of economic theory" by Jane Jacobs, and it's an excerpt from a book she's just got out called, "History and the Welfare - Cities and the Welfare of Nations", or something like that. And in this article, which is quite a long article, has nice pictures of guys from Adam Smith to Miltie Freidman, the latest, one of the latest Nobel Prize winners, she simply shows that economic theories do not work. Of course, John Kenneth Galbraith did this in "The New Industrial State" in 1969, but people don't seem to realize that he did it. Anyway, we can't let these guys dominate all our environmental thinking, especially when it doesn't make any difference whether they're right or wrong. Now they define the problems we're talking about largely in terms of externalities; they're not part of the economic system. You define them out of the system, and then you don't worry about them, and then you think, well, there are ways you can do it - you can put taxes on it or charge for it, or something like that, and everything will be okay. But clearly, that kind of thinking is not the kind of thinking that several people here have encouraged, that we bring environmental thinking into decisions at the early stages. The economists, the neo-classical economists, now, to modify that, think that it's sort of an appendix. That's the way, I think, we have treated things early, that's the sort of message that was involved in the first stages of Mr. Ross's bubble diagrams.

Now another thing that economists like to do is discount the future. In this neo-classical economics, there just is no way to protect posterity. They

may try to tell you that they have, but don't believe them. They like to discount the future and the extreme ones among them tell us that we can get along without natural resources, that if we do the discounting properly then we should be using resources faster than we are because in 100 years or 50 years or 35 years, depending on the interest rates you choose for your discounting, the resources won't be worth anything, so if we don't get them now, we're losing out. And we shouldn't leave too much to posterity because we're going to leave them better technology, and if we leave them better technology, we don't need to leave them resources. In some way, they can get more resources, even though we didn't leave them any just because they've got better technology; maybe they go to the moon.

Well, I want to come back to this question of posterity because it involves another major thing. Now we heard quite a bit about aggregate benefits, at least I did, maybe I was listening for it, that decisions are made sort of for the aggregate benefit of society, for the people of Alberta. Recognize that some people have to pay the environmental costs, the people in whose backyard the project occurs, mostly the rural people, we're told by Vern Millard, and Indian people, we're told by Marcel Piche. There are two very important short questions that I think we should ask: when all of these projects are first promoted who benefits and who pays? If the beneficiary is the same as the payee, there should be no problem. If these two groups are different, then there is obviously a question of compensation, and the beneficiaries should not hesitate to come forward with the compensation. It shouldn't be something you have to twist out of them, but apparently it is.

I want to make two short comments about the Slave River thing. I can't comment very extensively on this, I think, because if it ever does come to the EARP hearing, I'm a member of the EARP panel and my boss is sitting over there - Pat Duffy - he's the head of the thing. But there are a couple of things struck me that I think are relevant in more or less this context. I thought that the bubble diagrams that Mr. Ross showed were quite an interesting evolution. Like Alex, I have some doubts that we've attained the one where all three bubbles overlap, sort of like three of the five Olympic rings. I think the best example during this Symposium of the fact that they haven't reached

that stage, came in Mr. Pearce's paper. I tried to visualize the bubble diagram and all I can see is one bubble, and then two things that enter, economics and markets, and no other bubble would even be considered until some decision is made on that bubble, even in the next few months. So I don't see even the engineering bubble in sight at this point in that thing. So I think we have some way to go before those bubbles are really integrated. I would even suggest that in terms of this evolutionary development, from stage 1 to 2 to 3 and so on, that the thinking on the Slave River Dam is in stage minus 1.

The other comment closely related to this is that there was no indication in that talk that environmental concerns would play any part in the go/no go decision. Now, if the environmental decisions, environmental information does not play any role in the go/no go decision, then we're just playing marbles. You give a guy his assumptions an the game's over, and we're really just looking at cleaning up little bits and pieces here and there. That may be what we're left with, but initially the information should be up front in the go/no go decision.

Now economists don't like to talk about the tragedy of commons, but the kind of thing we're talking about here is the tragedy of the commons. If you haven't read Hardin's article, you should do it. These are common property resources, most of them, anyway, the things that are being impacted, and the things that we try to mitigate. The tragedy of the commons simply is that, given freedom in the commons, there'll be ruin for all. To make a longer story short, Hardin's only proposed solution for this, he says it's a set of problems that has no technical solution, one of a set of problems, the proposed solution is mutual coersion mutually-agreed upon, which essentially means that we all accept some limitation on our freedoms. We accept laws to be passed that will regulate our behaviour in the commons and some restrictions on our freedom, and that the restrictions will be enforced. That's the mutual coersion part of it. Now, we do this every day. We don't expect that we'll be allowed to park in the middle of the street and get out of our car, and come back ten minutes later and find the car still there, and if the car is gone we expect we're going to have to find it, and pay the towing charge and pay a fine. There is no more reason why an exploiter should expect to rip

up the environment and walk away and leave it in an unsatisfactory condition. There's no reason why an operation that is in full operation should dump its garbage untreated into rivers or allow toxic stuff to escape into rivers or into the air in excess of standards, if you like, and not be punished for it. I just find it incredible that this sort of thing goes on in this province. We had some evidence of this in the exchange between Mike Cooper and Ken Smith. That exchange also brought out very clearly that there is no environmental advocate for the people in this province.

The cooperative approach - cooperation's all fine, but cooperation in the commons, cooperation will work if everybody cooperates. But if there is one operator in the commons who fails to cooperate, the commons can be ruined. There are many places in our society when we should cooperate, but there's another biological analogy, and that is that we can't move only on the basis of muscles that cooperate with each other. You must have muscles that are antagonistic, you must have two sets of muscles, at least two, just to move your arm, one to bend them and one to straighten it again, because you can't push on a muscle any more than you can push on a rope. You can't do any fine things with your hands without the antagonistic action of sets of muscles. You can't regulate your blood sugar without the antagonistic action of two different hormones. In other words, you can't regulate the speed of an engine without two things operating in opposition to one another, one to add, to increase the fuel, ant the other to decrease it. In other words, regulation requires negative feedback. Negative feedback means there must be some penalty for departing from the set point, and I don't see any other way to regulate the gunk that goes into the air and the water, if that's really what we want to do.

Regulating agencies, of course, always raise another problem which is sometimes called the quis custodia problem. The full quotation is "quis custodia ipsos custodes", or "who will watch the watchers themselves?" Because regulatory agencies have a tendency to get captured by the group or the special interest that they're supposed to be regulating. So you have to have watchdogs on the watchdogs sometimes. But this does raise a problem, and there is no easy answer to that kind of problem. I think perhaps the best we

can do is have easy access to information, a well-informed public, as the best safeguard. Now, I was encouraged to hear that the ERCB is going to look at the backlog of information it has and is apparently going to make more of this information public, but discouraged, of course, to hear that the Department of Environment is making things more secret. I think the only solution I know to the "quis custodia" problem is an educated and informed public and without the information - information is power, as several people said, I think Alex referred to the future trend, at least that information is power - without the information, of course, we don't have the power, which may be why it's becoming harder and harder to get this information, of course.

Well, there's another corollary from the tragedy of the commons, and that is that voluntary restraint selects for its own favour. If you've studied any natural selection and know a little bit about evolution, it's not hard to figure out how that works, and it will work in an economic system, I think, just as well as in a biological system. A shorter way of saying that is what Leo Durocher said, "The good guys finish last". The guy who doesn't pay to take the gunk out of his chimney or his tailpipe, of course, is going to sell his stuff cheaper than the guy who does. The good guy who goes to the expense of keeping everything clean is going to finish last.

Well, the fact that we have no environmental advocate in our government seems to me to put us somewhere in terms of chronological time some years B.S.S. - that is, Before Silent Spring, which Alex referred to as one of the landmarks in instigating the environmental movement. So we're somewhere before 1962, I think. Maybe time is reversing here, like it is in some other parts of the world. There's another essay of Hardin's on that, but I won't go into that.

Well, there were a number of references to baseline research. The question was left open, though - well it wasn't left entirely open who should do it. There were suggestions that it was up to the scientists, I think by Mr. Brushett, particularly, the job of the scientists to get the baseline information. But he didn't tell us if the ERCB was going to hire the scientists to do it. He didn't tell us if the Department of Environment was

going to hire them, didn't tell us that there was going to be a large supply of money available for grants for university people to do it, or for consulting biologists to take contracts to do it. Maybe he thinks that the biological scientists don't need to eat, and they can get this information without having somebody pay them. Clearly, we do get baseline information on the weather and we reckon that to be an acceptable public cost, to maintain a weather service. We have a geological survey of Canada, the Alberta Research Council does many routine jobs. But there's nobody, there's no biological survey of Canada, there's no biological survey of any province, as far as I know, certainly no biological survey in Alberta. So, how are we going to induce scientists to go out and get this baseline information? Even biologists aren't that altruistic.

Well, I think this maybe brings me to - I think this is a job for government. And it's a job for scientists in government, scientists in the public service, in other words. They're not really in government - that's another word we misuse - the government refers to Cabinet. Scientists in the public service - and we tend to look down on public servants, which I think is a mistake. There are certain classes of public servants I look down on, but I don't look down on technical people in the public service. This is a public duty, in a sense. There should be no stigma attached to it, providing you discharge your duties adequately. The government is, after all, a creature of the society at large. They are our representatives; we have a representative democracy. Some of these research and monitoring things obviously have to be their responsibility, of some branch of that government. We don't have it in Environment, apparently. It appears as though we don't have it any more in the Fish and Wildlife Division, or at least they're phasing out research in the Fish and Wildlife Division of Energy and Natural Resources. I know from experience that the piddly little research grants that were available to university people are being phased out in the wildlife field. So who's going to do it? Apparently, it's not going to get done in this province. So none of this gives me much confidence that we will, in fact, keep Alberta green - keep Alberta as it is, rather ("Keep Alberta Green" is what you see on the signs) - as Bill Gunn exhorted us to do last night at the banquet. If we do, it's going to be an incredible miracle. I was impressed by the contrast, of

course, between Mr. Smith's presentation this morning and Dr. Leeson's, on the national parks, in which everything was allowed to hang out, nothing was held back.

Before I leave that, I think I have to make one other comment. It's a touchy one, but I don't care because I'm retiring on the 31st of August. This is the 8th Symposium, it's only the second one I've been at. I'm not a member of the Society, not because I have any philosophical objection to it, but I'm not in the consulting business, so I don't see the necessity to be a member. But I distinctly recall last year that the Minister was not here to open the conference and of course the Minister was not here again this year to open the conference. And a couple of speakers later, when Marcel Piche was speaking, the Minister is charge of Native Affairs was no longer in the room, even though he was here to open the conference. That tells me something about how important biology is to the present government of this province. I don't know if it tells you anything.

Well, here are a few more small points. I've discovered, I guess, because I'm a bit cynical sometimes, that if somebody quotes you a percentage, you should quickly convert it into an absolute amount, and if somebody quotes you an absolute amount, you should quickly convert it into a percentage, because the guy is not going to tell you the one he doesn't want you to think about. In the last election, of course, percentage wise, the NDP won hands down because they increased their membership by 100%, and the Conservatives only went up by five or something like that. But in absolute terms, of course, you know that that is not the result. Well, Mr. Millard Wright told us about the 1100 tonnes of sulphur, and they can take out 99% of it. Well, 1% of 1100 tonnes is still 11 tonnes and how much of this room would 11 tonnes of sulphur fill? I don't have much experience guessing the weight of sulphur, but it seems to me that 11 tonnes of sulphur is quite a bit of sulphur. We were told, I didn't get quite the exact number written down, but there was something like 3500 parameters being measured in the water or air quality, one or the other. And the compliance was something like 98% or somewhere between 96 and 99. With 2% of 3500, very quickly, is 70. So that means there were 70 non-compliances. We're not told what they were. But 70 is not, in my view,

necessarily an insignificant number. This one is a little bit different, but there's going to be $40 million spent on the pre-investment phases of the Peace River thing again, not all of it on environmental things. But even if it were all on environmental things, $40 million, which sounds like quite a bit of money to most of us, compared with $8 billion the plant will cost is 0.5%, one half of one percent. That doesn't seem an excessive amount, in relative terms. So I always - as soon as somebody quotes a percentage, I make a rough estimate of what the absolute amount is, and vice versa.

Well, let's see; I'm getting down here. You know, I think there's a question of morality, a question that goes beyond just the nuts and bolts of science and technology. I think Marcel Piche came close to it when he told us about his people and their beliefs, that the Great Spirit put them there and they have a duty to look after the Earth that the Great Spirit gave them. We in the Western world don't have so much of that. We tend to trace, most of us, I think, if we thought about it at all or if we've been influenced by our family at all, we go back to the Judeo-Christian story of creation, in which God gave Adam, in the words of the most popular English version of the Bible, anyway, dominion over everything, the land and the sea and everything that creeps and crawls and flies. There is a minor tendency in Western thought to substitute stewardship for dominion, but it hasn't really surfaced. It's still an undercurrent, and is likely to remain that way. I think this is, again, pertinent to the dragons, this is the difference between East and West, since Eastern religions do have spirits in trees and rocks and things like that, much like the ideas that Marcel told us about his people. There is a further moral responsibility that I think we have, and that's a responsibility to posterity. I've already suggested that neo-classical economics is bankrupt on this point. It seems to me that at some point we have to look at our actions and ask the fundamental question whether a certain action is right or wrong, in the way in which we're treating the environment. And that, in some cases, this kind of a question, which is strictly qualitative, should carry more weight than all the quantitative stuff that we can do, everything that we can measure and think of and count up may still not give us an answer that is morally the right answer. I would suggest that turning all the rivers in Alberta around, making them run south, is morally wrong. I can't really tell

you why, but I think that's a decision that doesn't - shouldn't - depend on cubic feet of water a second, or amounts of this or that, or anything else. It's just something that we shouldn't do.

Mike Cooper mentioned "ownermania". I think there's a real question whether we can really own anything. But assuming that we can really own anything, does that give us the right to destroy it? Do we have the unrestricted right to destroy a piece of land just because we are, quote, "owners"? I think that's a moral question. It's a question I think you have to be brave to ask in red-neck Alberta, because I'm pretty sure I know what answer you'd get from most people. But there is a trend of thought that says we don't own anything, we're merely borrowing it from posterity. It's ours to use while we're here, and then we pass it on to them.

Well, the last point I want to mention is time. And Alex referred to this, but I'm going to approach it in a slightly different context, I think. You can ask what's the proper time frame for a biologist to think in. Well, I hope you'll agree it's not the four-year time frame of a politician, the usual time between elections. Long-range thinking for an economist is five years. He didn't bat an eye - twenty years? Seventy years is the life of the Peace River dam. Alex said long-term; I'm not sure what his - he didn't put a number on it, which is okay. I think he meant longer than a few tens of years. But I think as biologists we can think of different time scales, and one of these I've already mentioned, political time scale, and the economic time scale, which is a few decades. And then we can go to an ecological time scale, which might be the time it takes for one cycle of forest succession, for instance, secondary succession, 300, 400, 500 years, something of that order. And beyond that, we go to evolutionary time, and evolutionary time, I think we're talking in the sort of average lifetime of a biological species and we're now into millions, a few million or even few tens of millions, perhaps. But we're a couple of orders of magnitude up. And, I think, as biologists we can't think in less than ecological time, and perhaps we should be thinking in evolutionary time, the life of our species, at least the life of our species. Then the question clearly is, can this single species, Homo sapiens, go on changing the face of the earth at the same rate as we've done

for about the last two hundred years, since we learned to exploit fossil fuels, essentially, James Watt and the steam engine, or tea kettle, is when I date this stuff. We have to recognize that we're an important agent of geological change, perhaps the most important agent of geological change that is now operating. I think, honour to our elders is one part of this. I think it implies that we feel that one day we'll be elders and there'll be a younger generation to honour us. I'm almost there now; I've got a birthday in a couple of weeks, and I think that makes me an elder. In other words, we should be able to see the continuity of the past and the present and the future. Particularly as biologists, we should be able to see this, ever since (Inaudible) continuity of the germ plasm - that's 100 years ago now - we've known there's a continuity of life. And, this concern for the future I don't think can be quantified in economic or an engineering sense. It's something you either have or you don't have. I think to have this, we need some kind of an ultimate end against which to judge our actions. Now, ironically enough, the best ultimate end that I've read about was proposed by an engineer who turned economist. And he proposed that the ultimate end of human activity, or human adventure on this planet, ought to be to maximize the number of person-years of human life. Now, you can't maximize two variables at once. You can't even do that mathematically. So you can either maximize the number of people and minimize the number of years, or the other way around, or something in the middle. I think we're acting as though we're going to maximize the number of people, and blast off in a great party as quickly as possible. And I just wonder if we shouldn't turn it around and try to maximize the number of years and do things at a slower pace.

Well, those are, I don't think, comments that draw the trends, at least, that's the sermon.

Thank you.

ABSTRACTS OF
PAPERS PRESENTED
AT
POSTER SESSION

POSTER PAPER

STREAMBANK AND INSTREAM HABITAT RESTORATION OF ALBERTA CREEKS AFFECTED BY OIL AND GAS ACTIVITIES

JIM ALLAN

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AND

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Since 1982 Pisces Environmental Consulting Services in association with Gulf Canada Resources Inc., has supplemented standard restoration of pipeline crossings in twenty-five high quality trout streams and one diversion through combinations of mechanical stabilization of the banks, transplants, re-establishment of stable pool: riffle regimes and substrate enhancement.

The work has successfully restored spawning and rearing habitat, shelter and pools. The stabilized banks have reduced siltation and the chance of slumping pipeline trenches or creek course changes, precluding the possibility of exposed pipe. With the cooperation of the Alberta Fish and Wildlife Division, and in consort with dry crossing techniques, it has allowed pipeline construction to continue into restricted times in the fall and spring.

POSTER PAPER

NATURAL DETOXIFICATION AND COLONIZATION OF TAR SANDS TAILINGS WATER

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The Clark hot water process for extracting bitumen from tar sand produces large volumes of toxic tailings water. Although a number of chemical methods exist for the detoxification of the waste waters, their application is not economically feasible at the present. Naturally occurring physical, chemical and biological processes may be important in detoxification of tailings water. At Syncrude Canada Ltd. the rate of naturally occurring detoxification and biotic colonization of both fresh tailings (50 parts sand, 50 parts water and clay, 1 part bitumen) and tailings pond surface water (0.5% suspended particulate matter) has been followed in experimental pits (15 m x 15 m area, 1.5 m and 2.5 m depth) and in *in situ* limnocorrals or water tubes that extend from the surface to the bottom of the tailings pond and enclose a column of water 2 m in diameter. Bitumen floating on the surface of the pits filled with fresh tailings disappeared within the first four weeks, but the amount of subsurface bitumen has not changed significantly over a 12 month period. Both the pits filled with fresh tailings and tailings pond surface water were colonized by phytoflagellate algae and ciliate protozoans during the first two months. A 20% reduction in toxicity over the first 12 months appear to have been primarily due to snow melt, rain and groundwater infiltration. Reduction in toxicity has been followed by colonization by aquatic insects. Addition of small amounts of phosphate fertilizer have increased the rate of detoxification. A large number of aquatic invertebrates have lived for one week in tailings pond surface water, which, when diluted by one-half, has also been shown to stimulate growth of some aquatic plants (duckweeds and cattails).

POSTER PAPER

A FLUMED PIPELINE CROSSING OF DISMAL CREEK

LEE LEWIS, GEORGE COLLIN AND WAYNE HART

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During January, February and March 1984, Petro-Canada Resources constructed the gathering and injection pipelines for a 706,000 cubic metre gas processing plant to be built in the Rocky Mountain Foothills of west central Alberta, approximately 50 km west-southwest of the townsite of Drayton Valley.

To maintain water flow and reduce silt to levels which protect identified area fish populations during the crossing, a 24 m long, 1220 mm O.D., metal-aproned flume and plastic-faced earthen dams, reinforced with sand bags, were installed to carry the creek over pipeline ROW during trenching, stringing and backfilling.

Following flume removal, the channel bed was dressed with the pit-run gravel and rubble which formed the temporary upstream and downstream dams and the stream banks were resorted.

Petro Canada will continue to consider fluming where the conditions of the pipeline crossing and quality of the aquatic resource warrant its use. Despite the success of this "dry" crossing technique at Dismal Creek, fluming should not be considered as a regular practice on streams of this size.

POSTER PAPER

SMALL MAMMALS AND AFFORESTATION IN COAL MINE RECLAMATION PROCEDURES AT THE JUDY CREEK TEST MINE SITE

DAVID F. PENNER AND P.S. JALKOTZY

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The survival of out-planted coniferous tree seedlings and small mammal populations have been monitored on the Judy Creek test mine site since Esso Resources Canada Ltd. excavated a bulk coal sample in 1979. Broadcast seeding of a grass/legume seed mix to stabilize disturbed soils resulted in establishment of a herbaceous cover on study plots which had increased to 89 percent by 1983. The herbaceous cover on the test mine site provides suitable habitat for several small mammal species, particularly the meadow vole (Microtus pennsylvanicus) whose population has increased rapidly to remain in the range of densities averaging 65 to 76 voles per ha during fall, 1981 to 1983. The deer mouse (Peromyscus maniculatus) population peaked in the second year following reclamation and then declined. Meadow voles were the implicated cause of an increasing proportion of tree seedling mortality from 1980 to 1983: 14 to 46% of the lodgepole pine and 16 to 48% of the white spruce mortality on seedlings sampled. Seedling mortality due to small mammals was a significant contributing factor in reducing survival rates to 56.3% for pine and 78.5% for spruce from 1980 to 1983.

POSTER PAPER

RECLAIM - A COMPUTERIZED RECLAMATION BIBLIOGRAPHY

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The Research Management Division of Alberta Environment, in conjunction with the Land Conservation and Reclamation Council, has developed a computerized reclamation bibliography. The project was funded by the Heritage Savings Trust Fund and the Research Management Division.

The bibliography, on a SPIRES file called RECLAIM at the University of Alberta, contains over 3000 references. Access is available by dialing 432-4811 (300 baud), or 432-2266 (1200 baud) or through Datapac, a low-cost, long distance telephone system.

The file may be searched by author, title, year and any of the 193 subjects. Logic operators (and, or, not) may be used to connect search terms. Results, in the form of bibliographic citations, may be displayed at the terminal or printed at the University of Alberta.

Further information may be obtained from the publication "Sims, H.P., and C.B. Powter, 1982. Land Surface Reclamation: An International Bibliography. Alberta Land Conservation and Reclamation Council Report #RRTAC 82-1. 2 Vols., 292 pp". Copies may be obtained from Queen's Printer, 11510 Kingsway Avenue, Edmonton, Alberta, for $5.00.

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